Khalda Petroleum Company		Petrofac	
Project: Salam Gas Trains (SGT3 & 4) Project			
Location: Egypt			
Client's Project No.:	1820	Petrofac Project No.:	JI-187

HAZOP CLOSEOUT REPORT

Petrofac International Ltd	
Doc. No.	1820-SA3-00-EHS-RPT-008
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Revision history

Rev	Date	Description of Change
A	12 February 2007	Draft For Review
B	23 February 2009	Issued For Approval

Approval Authority: (Project Manager / Project Engineering Manager)

Owner	Developer	Reviewer	Approver
GSN	HA	SOG	GSN

Abbreviation

C - Action Closed

R - Action Resolved

P - Action Pending

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
1	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	1. More Flow	1.2. failure of the controller 20-PIC 365/356 causing valve 20 PCV 365/356 to fully open	1.2.1.1. HIPPS; 1.2.1.2. DCS diagnostics	1.2.1.1. review design requirements for Fail Lock position of 20-PCV356/365A/B (note: existing design for SGT 1 & 2 is also fail lock philosophy)	PIL/ KPC	1	Process / Inst	C	Study/Review	FLDC (Failed Lock Drifting to Close) is provided as shown in PID 515 Rev.0 and accepted by KPC.	PID 515, C3 ,F3 and H3
2	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	1. More Flow	1.2. failure of the controller 20-PIC 365/356 causing valve 20 PCV 365/356 to fully open	1.2.2.1. none	1.2.2.1. configure high flow alarm off DCS for HP Flare System abnormal flow conditions	PIL	2	Process	R	Alarm/DCS	Agreed. High Flow Alarm in DCS is provided in the PID Rev.0 .	PID 612, A5
3	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	1. More Flow	1.2. failure of the controller 20-PIC 365/356 causing valve 20 PCV 365/356 to fully open	1.2.3.1. none	1.2.3.1. operating manual to address trouble shooting action in the case of failure of the control hardware	PIL/ KPC	3	Process	R	Procedure	Agreed, It will be addressed in the operating manual.	operating manual
4	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	1. More Flow	1.3. downstream plant malfunctioning causing increased flow	1.3.1.1. none	1.3.1.1. Ref. # 3			Process	R			operating manual
5	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	1. More Flow	1.3. downstream plant malfunctioning causing increased flow	1.3.2.1. none	1.3.2.1. Ref . # 2			Process	R			PID 612, A5
6	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	2. Less Flow	2.1. failure of tubes (SA-E-2032/2033)	2.1.2.1. production trend in DCS	2.1.2.1. provide both High and Low Flow Alarms 20-FQI-344/345	PIL	4	Process	R	Alarm/DCS	High and low flow alarms for 20-FQI-344/345 are provided and shown in the PID's Rev.0..	PID 515, F8
7	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	2. Less Flow	2.3. failure of the control loop hardware of 20-PIC 365/356 causing valve to partially close	2.3.1.1. 20-PZALL368/369/370 and 20-PZALL358/359/360; 2.3.1.2. DCS system diagnostics; 2.3.1.3. production trend in DCS	2.3.1.1. provide position transmitter for 20-PCV 356/365A/B as operability issue	PIL	5	Process / Inst	R	Hardware	Position transmitters for 20-PCV-356/365 A/B will be provided.	XI , XT provided but are not in the legend sheet.
8	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	2. Less Flow	2.3. failure of the control loop hardware of 20-PIC 365/356 causing valve to partially close	2.3.2.1. 20-PZALL368/369/370 and 20-PZALL358/359/360; 2.3.2.2. DCS system diagnostics; 2.3.2.3. production log (DCS)	2.3.2.1. review response of down stream control and safety system to operate in safe mode of operation after loss of pressure control	PIL/ KPC	6	Process	C	Study/Review	KPC to consider that the downstream system have adequate safeguardings.	-
9	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	2. Less Flow	2.4. Failure of control loop hardware causing valves 20-PCV 365/356 to stay in low open position	2.4.1.1. production trend in DCS; 2.4.1.2. 50% split range control	2.4.1.1. Ref. # 6			Process	C			18703003-A2631-C03-001 Sheet 2 of 8, Rev 2
10	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	3. No Flow	3.1. inadvertant closure of manual valves	3.1.1.1. existing plant LO/ LC philosophy has been followed; 3.1.1.2. sound engineering practices used; 3.1.1.3. cannot slam close application ball valves; 3.1.1.4. 20-PZALL368/369/370 and 20-PZALL358/359/360; 3.1.1.5. 20-PZAHH372/373/374 and 20-PZAHH362/363/364 (closure of separator inlet valve); 3.1.1.6. 20-PICAL365 and 20-PICAL-356; 3.1.1.7. Lock Open valve for separator inlet isolation	3.1.1.1. review LO/LC management systems and procedures and implement accordingly	KPC	7	KPC	P	Study/Review	LO / LC valve management systems are not presently in place. This will be developed and introduced by KPC Operations in due course.	-
11	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	3. No Flow	3.1. inadvertant closure of manual valves	3.1.2.1. none	3.1.2.1. review availability of HP protection system at the upstream facilities of the plant. Review need for automatic isolation by ESD action at the inlet to the slug catcher.	KPC	8	KPC	P	Study/Review	Design for slug catcher not yet available so we can not answer this now.	-
12	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	6. Lower Pressure	6.1. accidential damage to pipes/valves/equipment	6.1.1.1. F&G system; 6.1.1.2. ESD system	6.1.1.1. consequence modeling to advice if the common shut down action for SGT3 & SGT4 is required based on the results of the modeling	PIL	9	HSE	R	Study/Review	Consequence modeling is done,based on the results of the concequnce modeling : there is no fire excalation potential from one train to other, accordingly common shutdown action for SGT3 & SGT4 is not required.	-
13	1	PHASE I: Feed gas from Slug Cathcher (SA-V-2034) to the inlet separator (SA-V-2031) and to the SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-520	9. Sampling	9.1. insufficient sampling points in the plant	9.1.1.1. none	9.1.1.1. provide additional sample points downstream of 20-PCV356/365A/B	PIL	10	Process	R	Hardware	Sampling points are provided downstream of the 20-PCV-356/365 A/B. Refer PID Rev.0.	PID 515, F4 and C4
14	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	1. More Flow	1.2. failure of the controller 20-PICA 315 causing valve 20 PCV 315 to fully open	1.2.1.1. none	1.2.1.1. Ref. # 2			Process	R			PID 612, A5
15	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	1. More Flow	1.2. failure of the controller 20-PICA 315 causing valve 20 PCV 315 to fully open	1.2.2.1. none	1.2.2.1. review operator's action in the case of failure of the control hardware	KPC	11	Process	R	Procedure	Agreed. It will be addressed in the operating manual.	operating manual
16	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	2. Less Flow	2.3. mesh pad (SA-V-2031) / filter elements (SA-S-3031) blockages	2.3.1.1. production log (DCS)	2.3.1.1. operator's manual to include trouble shooting action of the demister pad blockage by checking reading of 20 PT-312/315	PIL/ KPC	12	Process	R	Procedure	It will be included in the operating manual.	operating manual
17	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	2. Less Flow	2.3. mesh pad (SA-V-2031) / filter elements (SA-S-3031) blockages	2.3.1.1. production log (DCS)	2.3.1.2. provide indication in the DCS of 20 PT-312	PIL	13	Process	R	Alarm/DCS	Indication of 20-PT-312 in DCS is provided. Refer to PID Rev.0.	PID 520, E3
18	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	3. No Flow	3.1. inadvertant closure of manual valves	3.1.1.1. operating guidelines; 3.1.1.2. cannot slam close application ball valves; 3.1.1.3. 20 PAL-302 (closure of manual valve up stream (SA -S-3031)	3.1.1.1. Ref. # 7			KPC	P			-
19	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	3. No Flow	3.1. inadvertant closure of manual valves	3.1.2.1. pressure relief system	3.1.2.1. relocate 20 FT-304 and 20 TT-316 to the line downstream the vent line and configure low flow alarm	PIL	14	Process	R	Others	Agreed. It is reflected in the PID Rev.0.	PID 520, C6
20	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	5. Lower Pressure	5.1. accidential damage to pipes/valves/equipment	5.1.1.1. F &G system; 5.1.1.2. ESD system	5.1.1.1. Ref. #: 9			HSE	R			-
21	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	7. Higher Level	7.3. failure of the controller 30 LICA-304 causing valve 30 LCV-304 to fully close	7.3.1.1. 30 LZAHH-305	7.3.1.1. confirm with vendor that location of the 30 LT-305 nozzles will not reduce separation efficiency of the cartridges below acceptable level in case flooding lower section of the vessel	PIL	15	Process	R	Study/Review	High High Alarm and trip is provided and it is reflected in the PID Rev.0.	PID 520, F4

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
22	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	8. Sampling	8.1. insufficient number of sampling points in the plant	8.1.1.1. none	8.1.1.1. provide additional sample points at upstream of mercury removal vessel (SA-V-3031)	PIL	16	Process	R	Hardware	Sampling point is provided at the mercury vessel inlet pipe and it is reflected in the PID Rev.0.	PID 571, C3
23	2	PHASE I:From Inlet Separator (SA-V2031) and Recycle Compressor 2nd stage (SA-K-2531) to Mercury Removal Vessel (SA-V-3031)	1820-SA3-20-EPR-PID-520;1820-SA3-25-EPR-PID-552;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571	9. Corrosion	9.1. electro potential difference between carbon steel vessels and duplex stainless steel piping	9.1.1.1. insulating kits for dissimilar materials at piping flange connections; 9.1.1.2. F&G; 9.1.1.3. ESD	9.1.1.1. review requirements for insulating kits for flanges between lined vessels and the piping of dissimilar materials as well as for stainless steel thermo wells on non stainless steel lines	PIL/ KPC	17	Process	R	Study/Review Hardware	The insulating joints will be provided for : 1) Spec break for above ground pipe lines with dissimilar MOCs. 2) Above ground metallic pipe lines going underground due to CP for underground section. 3) Storage Tanks with CP – for pipe lines connected to tank nozzles. 4) Vessel nozzle connections when joined by pipe lines with dissimilar MOC. 5) Vessels having internal coating or lining - nozzle connecting to pipe lines.	-
24	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	2. Less Flow	2.3. mercury removal vessel (SA-V-3031)/ demercurised gas filter(SA-S-3032) bed blockages/ glycol contractor demister pads (SA-C-2731)/ turbo expander feed drum (SA-V-2831) mesh pad/ Gas/Gas/ NGL exchanger blockages (SA-E-2831)	2.3.1.1. production log (DCS); 2.3.1.2. 30 PDIAH 304 for (SA-V-3031); 2.3.1.3. 30 PDIAH 306 for (SA-S-3032); 2.3.1.4. 28 PDIAH 306 for (SA-E-2831)	2.3.1.1. during vendor HAZOP review need for additional PT at the glycol contactor (SA-C-2731) outlet to trouble shoot blockages of the demister pads	PIL	18	Process	R	Study/Review Hardware	The pressure upstream of demister can be obtained from 27-PI-303(below the packing of contractor) and 27-PDI-302 (across packing). Comparing the above value with 28-PI-300 located on the Contractor outlet line will give clear indication on the demister status. Hence no additional PT is required.	-
25	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	2. Less Flow	2.3. mercury removal vessel (SA-V-3031)/ demercurised gas filter(SA-S-3032) bed blockages/ glycol contractor demister pads (SA-C-2731)/ turbo expander feed drum (SA-V-2831) mesh pad/ Gas/Gas/ NGL exchanger blockages (SA-E-2831)	2.3.1.1. production log (DCS); 2.3.1.2. 30 PDIAH 304 for (SA-V-3031); 2.3.1.3. 30 PDIAH 306 for (SA-S-3032); 2.3.1.4. 28 PDIAH 306 for (SA-E-2831)	2.3.1.2. move local pressure gauge tapping on vessel (SA-V-2831) to down stream mesh pad point 28 PI 308	PIL	19	Process	R	Others	Agreed. 28-PT-308 shifted downstream of mesh pad (SA-V-2831). Refer to PID Rev.0.	PID 590, B8
26	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	2. Less Flow	2.4. failure to open the main gas line isolation valve at the GlycolContactor outlet and start up bypass left open	2.4.1.1. none	2.4.1.1. include start up procedure steps part of operating manual to open the main isolation valve after pressure is established	PIL/ KPC	20	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
27	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	2. Less Flow	2.8. damage to the piping/leaks	2.8.2.1. drip pan connected to open drain header (minor leakage)	2.8.2.1. review requirements for secondary containment for glycol regeneration based on hold-up volume/capability to drain to open drain system	PIL	159	Static(Vendor)/Piping / Civil	R	Study/Review	Regenerator area is paved with curb wall. Drain from this curbed area is routed to open drain.	-
28	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	3. No Flow	3.2. inadvertant closure of manual valves (gas lines)	3.2.1.1. operating guidelines; 3.2.1.2. cannot slam close application ball valves; 3.2.1.3. 20 PIAL 302 (closure of manual valve up stream (SA -S-3031)	3.2.1.1. Ref. # 7			KPC	P			-
29	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	3. No Flow	3.2. inadvertant closure of manual valves (gas lines)	3.2.2.1. pressure relief system	3.2.2.1. relocate 20 FT-304 and 20 TT-316 to the line downstream the vent line and configure low flow alarms	PIL	21	Process	R	Others	Agreed. It is reflected in the PID Rev.0.	Repeated recommendation with 19-2
30	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	3. No Flow	3.3. bypass open (mercury removal unit (SA-V-3031))	3.3.1.1. none	3.3.1.1. review need for operating procedure/standing instruction for operation of mercury removal unit bypass	KPC	22	KPC	P	Study/Review	Current instructions for SGT 1&2 apply to 3&4. To be noted in PIL & KPC procedures.	KPC to provide the current instructions for SGT1&2.
31	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	3. No Flow	3.3. bypass open (mercury removal unit (SA-V-3031))	3.3.2.1. none	3.3.2.1. provide lock closed arrangement on the valve in the bypass line	PIL	23	Process	R	PID representation	Agreed. Locked Close (LC) arrangement is provided. Refer to PID Rev.0.	PID 570, F1
32	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	5. Lower Pressure	5.2. accidential damage to pipes/valves/equipment	5.2.1.1. F &G system; 5.2.1.2. ESD system	5.2.1.1. Ref. # 9			HSE	R			-
33	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	6. Lower Temperature	6.2. low ambient temperature & failure of the controller 27-TDICA-352 causing valve 27-TCV-352 to close	6.2.1.1. DCS diagnostics; 6.2.1.2. oil bucket in SA-V-2733; 6.2.1.3. 27-LICAH-352	6.2.1.1. provide operating procedures part of operating manual to troubleshoot narrow/negative temperature approach with inlet gas to SA-C-2731	PIL/ KPC	160	Static (vendor)/ Process	R	Procedure	Confirmed. Vendor (DPS-Delta) operating procedure will mention the details for troubleshoot narrow/negative approach temperature with inlet gas to SA-C-2731.	-
34	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	6. Lower Temperature	6.3. low ambient temperature & failure of the controller hardware 27-TDICA-352 causing valve 27-TCV-352 to go to fail safe mode	6.3.1.1. 27-TDICAL-352; 6.3.1.2. oil bucket in SA-V-2733; 6.3.1.3. 27-LICAH-352	6.3.1.1. refer to 6.2.1.1Ref.160			Static (vendor)/ Process	R			-
35	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	10. instrumentation	10.1. designation of the level control principle on the vessel drain streams	10.1.1.1. none	10.1.1.1. define control principle (continous or ON/OFF control and designate on the P&ID accordingly) \nNOTE: recommendation applicable for all P&IDs having level control	PIL	24	Process	R	Study/Review	The control principles are defined and the relevant PID's will be updated accordingly.	PID 570, G6
36	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	10. instrumentation	10.2. residual mercury in the gas	10.2.1.1. none	10.2.1.1. review selection of 27-AT-300 considering the presence of mercury	PIL	161	Instrument	R	Study/Review	Selection of 27-at-300 is reviewed & procurement is done accordingly.	-
37	3	PHASE I:From Mercury Removal Vessel (SA-V-3031) to Glycol Contactor (SA-C-2731) and From Glycol Contactor (SA-C-2731) and Mercury Removal Unit bypass stream to Turbo Expander (SA-A-2831) including lean glycol streams from SA-V-2732 (liquid side PHASE II)	1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 6	11. Safety	11.1. spraying hot glycol under pressure	11.1.1.1. none	11.1.1.1. provide safety shower/eye wash at locations near to glycol regeneration skid	PIL	162	HSE	R	Others	Safety shower/eye wash at locations near to glycol regeneration skid is provided. Refer Safety Equipment Layout, Doc. No. 1820-SA3-74-EHS-FPE-003, Rev 0.	-
38	4	Turbo Expander Package (SA-A-2831)	1820-SA3-28-EPR-PID-591;GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	6. Corrosion	6.1. dissimilar materials piping/ valves and piping/ equipment (machine and utilities)	6.1.1.1. none	6.1.1.1. provide insulation kits for connections of dissimilar materials	PIL	163	Process / Piping	R	Study/Review	The insulating joints requirements for the turbo-expander package are shown in the PID Rev.0.	New, PID 591, F4, F5 and F6

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
39	4	Turbo Expander Package (SA-A-2831)	1820-SA3-28-EPR-PID-591;GER315D3 sht 1/2 - vendor drawing;GER315D3 sht 2/2 -vendor drawing	7. instrumentation	7.1. no requirement for SIL rated PLC	7.1.1.1. none	7.1.1.1. assess SIL requirements for the loop of ESV 309 during SIL study	PIL	164	Instrument	R	Study/Review	SIL Assessment done for this loop. Recommedations forwarded to the client.	New
40	4	Turbo Expander Package (SA-A-2831)	1820-SA3-28-EPR-PID-591;GER315D3 sht 1/2 - vendor drawing;GER315D3 sht 2/2 -vendor drawing	8. General	8.1. pressurization during cold start up of T.EX./ recompressor	8.1.1.1. none	8.1.1.1. remove bypass lines around ESVs and provide slow opening of ESVs (required time minimum 10 seconds)	PIL	165	Process / Instrument	R	Hardware	28-ESV-3306 & 28-ESV-3307 with "RO" is kept as it is since 28-ESV-3301 and 28-ESV-3302 opening time is less than 10 seconds. Also slow start-up of machine is recommended.	New, PID 591, F3
41	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	1. More Flow	1.2. failure of the controller 28 PIC 324 causing valve 28-PCV 324 to fully open	1.2.1.1. DCS diagnostics; 1.2.1.2. T.EX. over speed protection; 1.2.1.3. 28 PICAH-324	1.2.1.1. Ref. # 2			Process	R			PID 612, A5
42	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	1. More Flow	1.2. failure of the controller 28 PIC 324 causing valve 28-PCV 324 to fully open	1.2.2.1. DCS production log	1.2.2.1. Ref. # 7			KPC	P			-
43	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	1. More Flow	1.3. failure of the controller 28 PIC 301 causing valve 28-PCV 301 to fully open (during T.EX. bypass mode)	1.3.1.1. DCS diagnostics; 1.3.1.2. T. EX. speed control protection: 28 SIC 101; 1.3.1.3. T.EX. over speed trip	1.3.1.1. change from normally close valves to normally open valves for isolation valves up stream/ down stream 28 FCV 301B on the P&ID	PIL	25	Process	R	PID representation	Agreed. The valves positions changed to normally open. Refer to PID Rev.0.	Tag No 28 FCV 301B changed to 28 FCV 3351 PID 591, D3
44	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	1. More Flow	1.5. failure of the controller 28 FIC 300 causing valve 28-FCV 351 (JT valve) to fully open	1.5.2.1. none	1.5.2.1. review operator's action in the case of failure of the control hardware	PIL/ KPC	26	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
45	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	1. More Flow	1.5. failure of the controller 28 FIC 300 causing valve 28-FCV 351 (JT valve) to fully open	1.5.3.1. none	1.5.3.1. review operator's action in the case of failure of the control hardware	PIL/ KPC	27	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
46	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	2. Less Flow	2.4. mesh pad (SA-V-2832) / (SA-E-2831) inlet strainer blockages	2.4.1.1. production log (DCS); 2.4.1.2. 28 PDI 327	2.4.1.1. operator's manual to include trouble shooting of the demister pad blockage by checking reading of 28 PT-314/ 28 PICA-301	PIL/ KPC	28	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
47	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	3. No Flow	3.1. inadvertant closure of manual valves	3.1.1.1. operating guidelines; 3.1.1.2. cannot slam close application ball valves	3.1.1.1. Ref. # 7			KPC	P			-
48	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	3. No Flow	3.1. inadvertant closure of manual valves	3.1.1.1. operating guidelines; 3.1.1.2. cannot slam close application ball valves	3.1.1.2. Ref. # 2			Process	R			PID 612, A5
49	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	3. No Flow	3.5. failure of the controller 28 TICA 303 causing both valves to fully close	3.5.2.1. DCS production log	3.5.2.1. review operator's action in the case of failure of the control hardware	PIL/ KPC	29	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
50	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	3. No Flow	3.6. tripping of T.EX.	3.6.1.1. DCS production log	3.6.1.1. Ref. # 3			Process	R			operating manual
51	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	5. Lower Pressure	5.1. accidential damage to pipes/valves/equipment	5.1.1.1. F &G system; 5.1.1.2. ESD system; 5.1.1.3. 28 PZALL-316; 5.1.1.4. 28 PIAL-318	5.1.1.1. Ref # 9			HSE	R			-
52	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	7. Lower Temperature	7.1. failure of the controller of 28-TIC 303 causing both valves to go to safe mode (see no flow deviation)	7.1.2.1. 28 TZALL 320; 7.1.2.2. 28 TIAL 317; 7.1.2.3. methanol injection point (MIP)	7.1.2.1. provide MIP; Methanol injection Point at the vapour outlet of (SA-V-2832) up stream 28 TCV 303A	PIL	30	Process	R	Hardware	MIP provided, refer PID Rev.0.	PID 590, D2
53	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	7. Lower Temperature	7.2. failure of the controller 21-TICA 346 causing valve to go to fully open	7.2.1.1. DCS diagnostics	7.2.1.1. provide low temperature alarm off 21 TIA 344	PIL	31	Process	R	Alarm/DCS	Agreed. Low temperature alarm provided, refer PID Rev.0.	PID 533, C4
54	5	PHASE I:From Turbo Expander (SA-K-2831) to Re-compressor (SA-K-2832)	1820-SA3-21-EPR-PID-533;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591	8. composition	8.1. low performance of glycol unit	8.1.1.1. dew point analyser 27 AIAH 300 (glycol unit)	8.1.1.1. Ref # 30			Process	R			PID 590, D2
55	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	1. More Flow	1.2. failure of the control loop hardware 26 PICA 353 causing valve 26-PCV 353 to fully open	1.2.1.1. 26 PICAH-353	1.2.1.1. Ref. # 2			Process	R			PID 612, A5
56	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	1. More Flow	1.2. failure of the control loop hardware 26 PICA 353 causing valve 26-PCV 353 to fully open	1.2.2.1. DCS production log	1.2.2.1. review operator's action part of operating manual in the case of failure of the control hardware	PIL/ KPC	32	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
57	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	2. Less Flow	2.3. mesh pad (SA-V-2931A) inlet strainer blockages (SA-K-2931A)	2.3.1.1. production log (DCS); 2.3.1.2. 29 PDI 303 A	2.3.1.1. operator's manual to include trouble shooting of the demister pad blockage by checking reading of 29 PI-302 A and PIC-301A	PIL/ KPC	33	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
58	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	2. Less Flow	2.4. inadvertant opening of 29 BV 300 A	2.4.1.1. DCS diagnostics	2.4.1.1. Ref. # 2			Process	R			PID 612, A5
59	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	2. Less Flow	2.4. inadvertant opening of 29 BV 300 A	2.4.2.1. DCS production log	2.4.2.1. review operator's action in the case of failure of the controller	PIL/ KPC	34	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
60	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	3. No Flow	3.1. inadvertant closure of manual valves	3.1.1.1. operating guidelines / procedures; 3.1.1.2. cannot slam close application ball valves	3.1.1.1. Ref. # 2			Process	R			PID 612, A5
61	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	3. No Flow	3.4. failure of the control hardware of 28-PICA 301 causing valve 28 PCV 301 to fully close	3.4.1.1. pressure relief system; 3.4.1.2. DCS diagnostics; 3.4.1.3. 28 PICAH-324	3.4.1.1. Ref. # 2			Process	R			PID 612, A5
62	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	3. No Flow	3.5. failure of control loop hardware of 28 PCV 301 causing valve to go to fail safe close position	3.5.1.1. pressure relief system (membrane second stage); 3.5.1.2. 28 PICAH-324	3.5.1.1. Ref. # 2			Process	R			PID 612, A5
63	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	4. Reverse flow	4.1. failure of the controller of 26-PCV 353 causing valve to fully open	4.1.1.1. DCS diagnostics	4.1.1.1. Ref. # 2			Process	R			PID 612, A5
64	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	4. Reverse flow	4.1. failure of the controller of 26-PCV 353 causing valve to fully open	4.1.2.1. DCS production log	4.1.2.1. review operator's action in the case of failure of the control hardware	PIL/ KPC	35	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
65	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	4. Reverse flow	4.1. failure of the controller of 26-PCV 353 causing valve to fully open	4.1.3.1. restricted CV for 26 PCV 353	4.1.3.1. calculate full vent flow case (fully open CV for 26 PCV 353). In the case this flow exceeds maximum flow for 2nd stage membranes. If required, provide additional protection for membranes. Review outcome during the vendor HAZOP	PIL	36	Process	R	Study/Review	The maximum design flow of the valve corresponds to the normal flow from the 2nd stage membrane then no additional protection is required.	-
66	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	5. Higher Pressure	5.2. mechanical failure control loop hardware of 26 PCV 353 causing valve to (stuck) close and high pressure conditions of 2nd stage of membrane outlet	5.2.1.1. 26 PICAH-353; 5.2.1.2. design specification for the maximum flowrate of the gas export compressor	5.2.1.1. Ref # 34			Process	R			operating manual
67	6	PHASE I: From Recompressor (SA-K-2832) and second stage membranes (SA-M-2634) to Export Gas Compressor 1st stage (SA-k-2931A)	1820-SA3-26-EPR-PID-565;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595	6. Lower Pressure	6.1. accidential damage to pipes/valves/equipment	6.1.1.1. F &G system; 6.1.1.2. ESD system; 6.1.1.3. 29 PZALL-305A; 6.1.1.4. 26 PICAL-353	6.1.1.1. Ref # 9			HSE	R			-
68	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389484-Sheet 4	1. More Flow	1.2. failure of the controller 29-FIC-352 causing valve 29 -FCV-352 to fully open	1.2.1.1. none	1.2.1.1. Ref# 2			Process	R			PID 612, A5

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
69	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	1. More Flow	1.3. failure of the controller hardware 29-FIC-352 causing valve 29-FCV-352 to go to fail safe open mode	1.3.1.1. none	1.3.1.1. Ref# 2			Process	R			PID 612, A5
70	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	2. Less Flow	2.1. partial opening of the manual isolation valves (compressor discharge upstream recycle line)	2.1.2.1. 29-PZAHH-307A; 2.1.2.2. 29-RV-301A; 2.1.2.3. 29-PIAH-309A	2.1.2.1. remove compressor discharge cooler isolation valves	PIL	166	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 595, C7 and D7
71	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	2. Less Flow	2.1. partial opening of the manual isolation valves (compressor discharge upstream recycle line)	2.1.2.1. 29-PZAHH-307A; 2.1.2.2. 29-RV-301A; 2.1.2.3. 29-PIAH-309A	2.1.2.2. remove non-return valve from compressor discharge upstream SA-E-2931A	PIL	167	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 595, C6
72	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	2. Less Flow	2.2. blockages of the suction strainer	2.2.1.1. 29-PDI-303 (local); 2.2.1.2. upstream pressure controller 28-PICA-324; 2.2.1.3. 29-PIAL-304A	2.2.1.1. configure differential pressure indication and alarm across suction strainer using inputs from 29-PT-301A & 29-PT-304A	PIL	168	Process	R	PID Representation	Agreed. It is reflected in The PID Rev.0 .	Tag no. 29-PT-301A changed to 29-PT-3351A. PID 595, B4 and D4
△B 73	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	3. No Flow	3.2. failure of controller 28-PICA-301 causing valve 28-PCV-301 to close	3.2.1.1. anti-surge controller 29-FICA-352; 3.2.1.2. production log (DCS); 3.2.1.3. DCS Diagnostics	3.2.1.1. finalize the compressor dynamic simulation study to confirm anti-surge controller performance	PIL	169	Rotaing / Vendor	R	Study	Dynamic simulation study has confirmed anti-surge controller performance. However, study report is in code B.	-
74	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	3. No Flow	3.3. inadvertant closure of the manual isolation valves (compressor suction upstream recycle line)	3.3.1.1. production log (DCS)	3.3.1.1. interchange the location of 29-PT-304A & 29-PT-301A . adjust the PID accordingly to the change. provide low pressure alarm on 29-PT-301A	PIL	170	Process	R	PID Representation	Agreed. It is reflected in The PID Rev.0 .	Tag no. 29-PT-301A changed to 29-PT-3351A. PID 595, B4 and D4
75	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	3. No Flow	3.4. failure of the controller 29-FIC-352 causing valve 29 -FCV-352 to fully close/ valve stuck close	3.4.1.1. controller discrepancy alarm; 3.4.1.2. 29-VZAHH-392/393 (1oo2) /394/395 (1oo2); 3.4.1.3. 29-TZAHH-303A; 3.4.1.4. manual opening functionality 29-HIC-300A; 3.4.1.5. DCS Diagnostics	3.4.1.1. provide alarm from 29-TI-302A	PIL	171	Process	R	Alarm/DCS	Agreed. It is reflected in The PID Rev.0 .	Tag no. 29-TT-302A changed to 29-TT-3352A. PID 595, D6.
76	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	3. No Flow	3.4. failure of the controller 29-FIC-352 causing valve 29 -FCV-352 to fully close/ valve stuck close	3.4.1.1. controller discrepancy alarm; 3.4.1.2. 29-VZAHH-392/393 (1oo2) /394/395 (1oo2); 3.4.1.3. 29-TZAHH-303A; 3.4.1.4. manual opening functionality 29-HIC-300A; 3.4.1.5. DCS Diagnostics	3.4.1.2. provide operating procedure part of operating manual to periodically manipulate 29-HIC-300A	PIL/ KPC	172	Rotating (vendor) / Process	R	Procedure	Vendor confirmed that this shall be included in vendor's operating manual.	operating manual
77	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	5. Higher Temperature	5.1. failure of the controller 29-TICA 320A causing louvres to close	5.1.1.1. 29-TZAHH-303A; 5.1.1.2. 29-TZAHH-305A; 5.1.1.3. DCS diagnostics	5.1.1.1. Refer to 3.3.1.1 Ref.170			Process	R			PID 595, B4 and D4
78	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	5. Higher Temperature	5.2. failure of the control loop hardware 29-TICA-320A causing louvres to close	5.2.1.1. 29-TZAHH-303A; 5.2.1.2. 29-TZAHH-305A	5.2.1.1. Refer to 3.3.1.1 Ref. 170			Process	R			PID 595, B4 and D4
79	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	5. Higher Temperature	5.4. motor selection in manual/fail to start when required	5.4.1.1. refer to 5.2.1.1 and 5.2.1.2; 5.4.1.2. refer to 5.3.1.2; 5.4.1.3. (local start) 29-HS-301	5.4.1.1. Refer to 3.3.1.1 Ref 170			Process	R			PID 595, B4 and D4
80	7	PHASE II: Export Gas Compressor (SA-K-2931A) stage 1 discharge to membrane package stage 1	1820-SA3-29-EPR-PID-595;10000389464-Sheet 4	6. Maintenance	6.1. access to F&G instrumentation in compressor shed	6.1.1.1. none	6.1.1.1. review availability of access to F&G instrumentation	PIL	173	Rotaing / Vendor / Instrument	R	Review/Study	Mobile access platform will be provided for the F&G Instrumentation.	
81	8	PHASE II: From Export Gas Compressor stage 1 outlet 29 FSV 302 A (SA-K-2931A) to 1st stage Membrane 1st stage Skid (SA-M-2632) outlet including Membrane Skid bypass	1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-595;A2631-C03-001(SHT 2/8);A2631-C03-001(SHT 3/8)	3. No Flow	3.1. inadvertant closure of manual valves	3.1.1.1. operating guidelines; 3.1.1.2. 26-FZALL-300; 3.1.1.3. cannot slam close application ball valves; 3.1.1.4. 29 PZAHH-307A/B; 3.1.1.5. 29-PIAH-309A//B	3.1.1.1. Ref. # 7			KPC	P			-
82	8	PHASE II: From Export Gas Compressor stage 1 outlet 29 FSV 302 A (SA-K-2931A) to 1st stage Membrane 1st stage Skid (SA-M-2632) outlet including Membrane Skid bypass	1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-595;A2631-C03-001(SHT 2/8);A2631-C03-001(SHT 3/8)	3. No Flow	3.1. inadvertant closure of manual valves	3.1.1.1. operating guidelines; 3.1.1.2. 26-FZALL-300; 3.1.1.3. cannot slam close application ball valves; 3.1.1.4. 29 PZAHH-307A/B; 3.1.1.5. 29-PIAH-309A//B	3.1.1.2. provide low flow alarm from 26-FI-301/302/303	PIL	174	Process	R	Alarm/DCS	Agreed. It is reflected in The PID Rev.0 .	PID 560, G2, E2 and C2
83	8	PHASE II: From Export Gas Compressor stage 1 outlet 29 FSV 302 A (SA-K-2931A) to 1st stage Membrane 1st stage Skid (SA-M-2632) outlet including Membrane Skid bypass	1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-595;A2631-C03-001(SHT 2/8);A2631-C03-001(SHT 3/8)	3. No Flow	3.1. inadvertant closure of manual valves	3.1.2.1. none	3.1.2.1. Ref. # 2			Process	R			PID 612, A5
84	8	PHASE II: From Export Gas Compressor stage 1 outlet 29 FSV 302 A (SA-K-2931A) to 1st stage Membrane 1st stage Skid (SA-M-2632) outlet including Membrane Skid bypass	1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-595;A2631-C03-001(SHT 2/8);A2631-C03-001(SHT 3/8)	5. Lower Pressure	5.1. accidental damage to pipes/valves/equipment	5.1.1.1. F &G system; 5.1.1.2. ESD system	5.1.1.1. Ref. #: 9			HSE	R			-
85	8	PHASE II: From Export Gas Compressor stage 1 outlet 29 FSV 302 A (SA-K-2931A) to 1st stage Membrane 1st stage Skid (SA-M-2632) outlet including Membrane Skid bypass	1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-595;A2631-C03-001(SHT 2/8);A2631-C03-001(SHT 3/8)	10. Lower Level	10.1. failure of the controller 26 LICA-351 causing valve 26 LCV-351 to fully open	10.1.2.1. none	10.1.2.1. Ref. # 2			Process	R			PID 612, A5
86	8	PHASE II: From Export Gas Compressor stage 1 outlet 29 FSV 302 A (SA-K-2931A) to 1st stage Membrane 1st stage Skid (SA-M-2632) outlet including Membrane Skid bypass	1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-595;A2631-C03-001(SHT 2/8);A2631-C03-001(SHT 3/8)	13. Maintenance	13.1. positive isolation of the pretreatment units & individual membrane banks/no RO in the line	13.1.1.1. none	13.1.1.1. replace globe valve with ball valve	PIL	175	Static(Vendor)/Process	C	Hardware	Globe valve is replaced with Ball valve. Refer to Rev. 2 P&ID of UOP.	18703003-A2631-C03-001 Sheet 2 of 8, Rev 2
87	8	PHASE II: From Export Gas Compressor stage 1 outlet 29 FSV 302 A (SA-K-2931A) to 1st stage Membrane 1st stage Skid (SA-M-2632) outlet including Membrane Skid bypass	1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-595;A2631-C03-001(SHT 2/8);A2631-C03-001(SHT 3/8)	13. Maintenance	13.1. positive isolation of the pretreatment units & individual membrane banks/no RO in the line		13.1.2.1. provide RO in the start-up lines (for both pretreatment units & the membrane banks)	PIL	176	Static(Vendor)/Process	C	Hardware	RO provided in start-up line. Refer Rev.2 P&ID of UOP.	18703003-A2631-C03-001 Sheet 2 of 8, Rev 2
88	8	PHASE II: From Export Gas Compressor stage 1 outlet 29 FSV 302 A (SA-K-2931A) to 1st stage Membrane 1st stage Skid (SA-M-2632) outlet including Membrane Skid bypass	1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-595;A2631-C03-001(SHT 2/8);A2631-C03-001(SHT 3/8)	13. Maintenance	13.2. additional isolation valve in the common line inlet to the membrane unit	13.2.1.1. isolation on inlet to each membrane unit and start up bypass line	13.2.1.1. remove the isolation valve and replace it with upstream slip plate located in the same line	PIL	177	Static(Vendor)/Process	C	Hardware	Done. Refer Rev.2 P&ID of UOP.	18703003-A2631-C03-001 Sheet 2 of 8, Rev 2
89	8	PHASE II: From Export Gas Compressor stage 1 outlet 29 FSV 302 A (SA-K-2931A) to 1st stage Membrane 1st stage Skid (SA-M-2632) outlet including Membrane Skid bypass	1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-595;A2631-C03-001(SHT 2/8);A2631-C03-001(SHT 3/8)	14. Relief	14.1. external fire to SA-M-2631A-S2 & partial blockage of the guard bed	14.1.1.1. none	14.1.1.1. check the relief rate through the guard bed & account for desorbtion rate of the guard bed during relief	PIL	178	Static(Vendor)/Process	C	Review/Study	UOP's relief valve datasheet reviewed & found ok.	-
90	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	1. More Flow	1.2. failure of the controller 29-FIC-306 causing valve 29 -FCV-306A/B to fully open	1.2.1.1. DCS production log; 1.2.1.2. DCS diagnostics; 1.2.1.3. 29-TZAHH-317A; 1.2.1.4. 29-PIAL-332A; 1.2.1.5. 29-PICA-018 (will close)	1.2.1.1. provide high flow alarm of 29-FIA-302A based on minimum back pressure allowable for the compressor	PIL	179	Rotating (vendor) / Process	R	Alarm/DCS	Agreed. It is reflected in the Rev.0 P&ID. Vendor to advise set point for high flow alarm.	Tag no. 29-FIA-302 changed to 29-FIA-3355A, PID 597, D5
91	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	1. More Flow	1.2. failure of the controller 29-FIC-306 causing valve 29 -FCV-306A/B to fully open	1.2.1.1. DCS production log; 1.2.1.2. DCS diagnostics; 1.2.1.3. 29-TZAHH-317A; 1.2.1.4. 29-PIAL-332A; 1.2.1.5. 29-PICA-018 (will close)	1.2.1.2. advise minimum back pressure in the export gas pipelines (north/south) for determining compressor performance	KPC	180	KPC	P			-
92	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	1. More Flow	1.4. failure of the controller 29-PICA-018 causing valve 29 -PCV-018A/B to fully open	1.4.1.1. DCS production log; 1.4.1.2. DCS diagnostics; 1.4.1.3. 29-TZAHH-317A; 1.4.1.4. 29-PIAL-332A	1.4.1.1. review response of 29-FIC-306 in the case of failure of 29-PICA-018 (possible solution to provide low pressure override on 29-FIC-306)	PIL/ KPC	181	Process / Instrument	R	Review/Study	Agreed. Low pressure override will be provided and it will be reflected in the updated PID.	1814-SA-29-DW-P-401 Rev.2
93	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	2. Less Flow	2.1. blockages of the suction strainer	2.1.1.1. 29-PDI-327A (local); 2.1.1.2. 29-PIAL-328A	2.1.1.1. relocate non-return valve from compressor discharge upstream SA-E-2932A to downstream of recycle take-off	PIL	182	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 597, F7

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
94	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	2. Less Flow	2.1. blockages of the suction strainer	2.1.1.1. 29-PDI-327A (local); 2.1.1.2. 29-PIAL-328A	2.1.1.2. configure differential pressure indication and alarm across suction strainer using 29-PT-325A & 29-PT-328A	PIL	183	Process	R	PID Representation	Agreed. It is reflected in The PID Rev.0 .	Tag no. 29-PT-325 A changed to 29-PT3354A, PID 597, B4
95 (9)	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	2. Less Flow	2.1. blockages of the suction strainer	2.1.1.1. 29-PDI-327A (local); 2.1.1.2. 29-PIAL-328A	2.1.1.3. finalize the compressor dynamic simulation study to confirm anti-surge controller performance	PIL	184	Rotaing / Vendor	R	Study	Dynamic simulation study has confirmed anti-surge controller performance. However, study report is in code B.	-
96	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	2. Less Flow	2.2. mesh pad (SA-V-2932A) blockages	2.2.1.1. production log (DCS); 2.2.1.2. 29-PDI-327 A	2.2.1.1. refer to 2.1.1.2 Ref # 183			Process	R			PID 597, B4
97	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	3. No Flow	3.1. inadvertant closure of the manual isolation valves (compressor suction upstream recycle line)	3.1.1.1. production log (DCS)	3.1.1.1. interchange the location of 29-PT-328A & 29-PT-325A . adjust the PID accordingly to the change. provide low pressure alarm on 29-PT-325A	PIL	185	Process	R	Alarm/DCS & PID Representation	Agreed. It is reflected in The PID Rev.0 .	Tag no. 29-PT-325 A changed to 29-PT3354A, PID 597, D4
98	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	3. No Flow	3.1. inadvertant closure of the manual isolation valves (compressor suction upstream recycle line)	3.1.1.1. production log (DCS)	3.1.1.2. provide alarm from 29-TI-316A	PIL	186	Process	R	Alarm/DCS	Agreed. It is reflected in The PID Rev.0 .	Tag no. 29-TI-316 A changed to 29-TI_3355A, PID 597, E5
99	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	3. No Flow	3.2. failure of the controller 29-FIC-302A causing valve 29 -UCV-302A to fully close/ valve stuck close	3.2.1.1. controller discrepancy alarm; 3.2.1.2. 29-VZAHH-392/393 (1oo2) /394/395 (1oo2); 3.2.1.3. 29-TZAHH-317A; 3.2.1.4. manual opening functionality 29-HIC-301A	3.2.1.1. provide operating procedure part of operating manual to periodically manipulate 29-HIC-301A	PIL/ KPC	187	Rotating (vendor) / Process	R	Procedure	Agreed. It will be reflected in vendor's operating manual.	operating manual
100	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	3. No Flow	3.2. failure of the controller 29-FIC-302A causing valve 29 -UCV-302A to fully close/ valve stuck close	3.2.1.1. controller discrepancy alarm; 3.2.1.2. 29-VZAHH-392/393 (1oo2) /394/395 (1oo2); 3.2.1.3. 29-TZAHH-317A; 3.2.1.4. manual opening functionality 29-HIC-301A	3.2.1.2. review need for a surge counter action to trip the compressor (review for 1st stage compressor as well)	PIL/ KPC	188	Rotating / vendor	P	Study / Review	Action by KPC	-
101	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	4. Reverse Flow	4.1. starting up one of the trains while the other trains are offline	4.1.1.1. none	4.1.1.1. provide non-return valves in the common export gas pipework (outside the project scope) where required	KPC	189	KPC	P			-
102	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	6. Higher Temperature	6.1. failure of the controller 29-TICA 318A causing louvres to close	6.1.1.1. 29-TZAHH-317A; 6.1.1.2. DCS diagnostics; 6.1.1.3. inherent cooling in SA-E-2932 in case of louvre closure	6.1.1.1. Refer to 3.2.1.2, Ref # 188			Rotating / vendor	P		Action by KPC	-
103	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	6. Higher Temperature	6.2. failure of the control loop hardware 29-TICA-318A causing louvres to close	6.2.1.1. 29-TZAHH-317A; 6.2.1.2. 29-TICAH-318A	6.2.1.1. Refer to 3.2.1.2, Ref # 188			Rotating / vendor	P		Action by KPC	-
104	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	6. Higher Temperature	6.4. motor selection in manual/fail to start when required	6.4.1.1. refer to 6.2.1.1 and 6.2.1.2; 6.4.1.2. refer to 6.3.1.2; 6.4.1.3. (local start) 29-HS-303	6.4.1.1. Refer to 3.2.1.2, Ref # 188			Rotating / vendor	P		Action by KPC	-
105	9	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to Export Pipeline and Inlet Gas Separator header	1820-SA3-20-EPR-PID-515;1820-SA3-26-EPR-PID-560;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-29-EPR-PID-401	8. Instrumentation	8.1. additional gas production from trains 3&4	8.1.1.1. none	8.1.1.1. review rangebility of existing instrumentation and provide new if required	KPC	190	KPC	P			-
106	10	PHASE II: Export Gas Compressor (SA-K-2931) seal gas system, lube oil system and machine monitoring	1820-SA3-20-EPR-PID-515;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598	1. More flow	1.2. damage of the separation seal	1.2.1.1. 29-PIAL-375; 1.2.1.2. instructions and operating manual (IOM); 1.2.1.3. oil reservoir mist fan running indication	1.2.1.1. provide operating instructions (part of IOM) to check oil accumulation in the drain point of the compartment between secondary seal and bearing	PIL/ KPC	191	Rotating (vendor) / Process	R	Procedure	Vendor confirmed that this shall be included in vendor's operating manual.	-
107	10	PHASE II: Export Gas Compressor (SA-K-2931) seal gas system, lube oil system and machine monitoring	1820-SA3-20-EPR-PID-515;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598	2. Less Flow	2.1. damage of the secondary seal	2.1.1.1. 29-FIAL-375/376; 2.1.1.2. 29-PIAL-372/374	2.1.1.1. atmospheric vent to high point to be considered to hazardous area classification	PIL	192	HSE / Piping	R	Review/Study	Considered, refer note no. 9 (all vents will be treated as zone 1) in Hazardous Area Classification Layout,Doc. No.1820-SA3-74-EHS-HAC-001,Rev 0.	-
108	10	PHASE II: Export Gas Compressor (SA-K-2931) seal gas system, lube oil system and machine monitoring	1820-SA3-20-EPR-PID-515;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598	3. No flow	3.2. no seal gas during start-up	3.2.1.1. 29-PDIAL-371	3.2.1.1. provide external seal gas supply from independant source	PIL / KPC	193	KPC / Process / Rotating	R		Refer 1820-SA3-10-EPR-PID-401Revision-1 P&ID where the External Seal Gas conncetion is provided for Export Gas Compressor from the Existing Export Gas Pipeline which is a independant source of Seal Gas supply.	PID 595, G8
109	10	PHASE II: Export Gas Compressor (SA-K-2931) seal gas system, lube oil system and machine monitoring	1820-SA3-20-EPR-PID-515;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598	3. No flow	3.2. no seal gas during start-up	3.2.1.1. 29-PDIAL-371	3.2.1.2. IOM to reflect no external seal gas required for hot settle-out and restart within the next 3 hours	PIL	194	Rotating (vendor)/process	R	Procedure	Refer 1820-SA3-10-EPR-PID-401Revision-1 P&ID where the External Seal Gas conncetion is provided for Export Gas Compressor from the Existing Export Gas Pipeline which is a independant source of Seal Gas supply. So the recommendation is not valid now.	
110	10	PHASE II: Export Gas Compressor (SA-K-2931) seal gas system, lube oil system and machine monitoring	1820-SA3-20-EPR-PID-515;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598	3. No flow	3.4. leakage gas to flare line plugged with condensate	3.4.1.1. 29-FIAL-376	3.4.1.1. provide top tapping on the flare line with a goose-neck and drain point	PIL	195	Process / Piping	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 595, C7 PID 596, C7
111	10	PHASE II: Export Gas Compressor (SA-K-2931) seal gas system, lube oil system and machine monitoring	1820-SA3-20-EPR-PID-515;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598	5. Higher Temperature	5.2. heater left on/failure of the controller 29-TICA-358 / 29-TIA-360 (lube oil and seal gas systems)	5.2.1.1. none for seal gas; 5.2.1.2. lube oil heater limited capacity; 5.2.1.3. refer to 5.1.1.1	5.2.1.1. review independant protection against high seal gas temperature in the heater outlet line	PIL	196	Rotating (vendor)	R		High Seal Gas temperature transmitter will be provided and same will be updated in next issue (Rev.C) of PID.	JI-18703007-K2931-C03-001 Rev.C
112 (9)	10	PHASE II: Export Gas Compressor (SA-K-2931) seal gas system, lube oil system and machine monitoring	1820-SA3-20-EPR-PID-515;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598	8. Contamination	8.1. failure of the inert gas package/ N2 contamination with O2	8.1.1.1. O2 analyzer in the inert gas package	8.1.1.1. review FMEA for this case during inert gas package HAZOP	PIL	197	Rotating (Vendor)	R		FMEA does not required for Inert Gas Generator as they are manufactured to Kaeser / Generon standard procedures and the design is based on their many years experience with in the Inert Gas Generation field. Please refer attachment-1 for vendor confirmation.	Attachment-1
113	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	1. More Flow	1.1. membrane failure (SA-M-2632)	1.1.2.1. none	1.1.2.1. Ref. # 2			Process	R			PID 612, A5
114	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	1. More Flow	1.2. failure of 26 PDIA 310 causing 26 ESV 305 to open during startup conditions	1.2.2.1. none	1.2.2.1. Ref. # 2			Process	R			PID 612, A5
115	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	1. More Flow	1.3. failure of the controller 26 PICA 311 causing valve 26-PCV 311 to fully open	1.3.2.1. none	1.3.2.1. Ref. # 2			Process	R			PID 612, A5
116	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	2. Less Flow	2.3. mesh pad (SA-V-2631/2632/2633) inlet strainer blockages on the suction strainers stage 1/ 2/ 3 (SA-K-2631)	2.3.1.1. production log (DCS); 2.3.1.2. differential pressure indication for stages 1/2/3 suction strainer for SA-K-2631	2.3.1.1. operator's manual to include trouble shooting of the demister pad blockage by checking reading of 26 PICA-311 & 26 PIAL-306 & 26 PIA 330 & 26 PIA 332 & 26 PIA 321 & 26 PIA 323	PIL/ KPC	198	Process / Static (Vendor)	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
117	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	2. Less Flow	2.4. failure of the control loop hardware 26 PICA 309 causing valve 26-PCV 309 to fully open	2.4.1.1. none	2.4.1.1. Ref. # 2			Process	R			PID 612, A5

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
118	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	2. Less Flow	2.4. failure of the control loop hardware 26 PICA 309 causing valve 26-PCV 309 to fully open	2.4.2.1. DCS production log; 2.4.2.2. 26 PICA 311	2.4.2.1. review operator's action in the case of failure of the controller loop components	PIL/ KPC	199	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
119	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	2. Less Flow	2.4. failure of the control loop hardware 26 PICA 309 causing valve 26-PCV 309 to fully open	2.4.2.1. DCS production log; 2.4.2.2. 26 PICA 311	2.4.2.2. provide high flow alarm from 26-FI-304	PIL	200	Process	R	Alarm/DCS	Agreed. It is reflected in The PID Rev.0 .	PID 560, D7
120	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	2. Less Flow	2.5. failure of the controller 26 PICA 309 causing valve 26-PCV 309 to fully open	2.5.1.1. none	2.5.1.1. Ref. # 2			Process	R			PID 612, A5
121	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	2. Less Flow	2.5. failure of the controller 26 PICA 309 causing valve 26-PCV 309 to fully open	2.5.2.1. DCS Diagnostics; 2.5.2.2. refer to 2.4.2.2	2.5.2.1. refer to 2.4.2.1Ref. 199			Process	R			-
122	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	2. Less Flow	2.7. restrictions/ reduction of N2 supply to the compressors' 1/2/3 packing	2.7.1.1. 26 PIAL 3400; 2.7.1.2. venting to safe location out side compressor shelter	2.7.1.1. review hazardous area classification of N2 vent area	PIL	201	HSE	R	Review/Study	Considered, refer note no. 9 (all vents will be treated as zone 1) in Hazardous Area Classification Layout,Doc. No.1820-SA3-74-EHS-HAC-001,Rev 0.	-
123	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	3. No Flow	3.1. inadvertant closure of manual valves	3.1.2.1. none	3.1.2.1. Ref. # 2			Process	R			PID 612, A5
124	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	3. No Flow	3.5. loss of N2 supply to the compressors' 1/2/3/4 packing	3.5.1.1. 26 PIAL 3400; 3.5.1.2. venting to safe location out side compressor shelter	3.5.1.1. refer to 2.7.1.1Ref. 201			HSE	R			-
125	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	5. Lower Pressure	5.1. accidential damage to pipes/valves/compressor system/equipment	5.1.1.1. F &G system; 5.1.1.2. ESD system; 5.1.1.3. 26 PZALL 315/324/ 333; 5.1.1.4. 26 PICAL 311/ 339; 5.1.1.5. 26 PIAL 316/323/ 332; 5.1.1.6. 26 FIAL 306/ 307/ 308	5.1.1.1. Ref # 9			HSE	R			-
126	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	6. Higher Temperature	6.4. motor selection in manual/fail to start when required	6.4.1.1. refer to 6.2.1.1 and 6.2.1.2; 6.4.1.2. 26 YL 300/301/302; 6.4.1.3. (local start) 26 HS 302/303/304	6.4.1.1. provide operating procedures to start motors from the field in the case of failure to start from DCS (common for all of the fin fan coolers in the plant)	PIL/ KPC	202	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
127	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	9. Safety	9.1. Available access to the lower section of the coupling	9.1.1.1. none	9.1.1.1. review requirements for full protection for compressor coupling access as per the modification done in the existing SGT-1&2	PIL	203	Rotating(vendor)/HSE	R	Study/Review	Modified flywheel cover (full cover) will be applied.	Civil to take care for support.
128	11	PHASE II: From 1st stage Membrane Skid (SA-M-2632) to 4th stage permeate compressor SA-K-2631	1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1G-15388 (Vendor Drawing)	10. Static	10.1. build-up of static by machinery rotation	10.1.1.1. earthing for motor provided	10.1.1.1. provide earthing arrangement for compressor base frame SA-K-2631 system	PIL	204	Rotating (vendor)/Electrical	R	Study/Review	Earthing terminals are provided on motors, terminal boxes of the motors, Compressor frame, heater assembly, package assemblies such as coolers / radiators etc.	18703005/6-K-2631/41-801-001 Rev. 4
129	12	PHASE II: From 4th stage permeate compressor SA-K-2631 outlet (26 ESV 307) to 2nd stage Membrane Package discharge including membrane skid 2nd stage bypass	1820-SA3-26-EPR-PID-565;A2631-C03-001(SHT 1/8);A2631-C03-001(SHT 6/8)	3. No Flow	3.1. inadvertant closure of manual valves	3.1.1.1. operating guidelines; 3.1.1.2. refer to 2.2.1.1; 3.1.1.3. cannot slam close application ball valves; 3.1.1.4. 26 PZAHH 344; 3.1.1.5. 26 PIAH 346	3.1.1.1. Ref. # 7			KPC	P			-
130	12	PHASE II: From 4th stage permeate compressor SA-K-2631 outlet (26 ESV 307) to 2nd stage Membrane Package discharge including membrane skid 2nd stage bypass	1820-SA3-26-EPR-PID-565;A2631-C03-001(SHT 1/8);A2631-C03-001(SHT 6/8)	3. No Flow	3.1. inadvertant closure of manual valves	3.1.2.1. none	3.1.2.1. Ref. # 2			Process	R			PID 612, A5
131	12	PHASE II: From 4th stage permeate compressor SA-K-2631 outlet (26 ESV 307) to 2nd stage Membrane Package discharge including membrane skid 2nd stage bypass	1820-SA3-26-EPR-PID-565;A2631-C03-001(SHT 1/8);A2631-C03-001(SHT 6/8)	5. Lower Pressure	5.1. accidential damage to pipes/valves/equipment	5.1.1.1. F &G system; 5.1.1.2. ESD system	5.1.1.1. Ref. #: 9			HSE	R			-
132	12	PHASE II: From 4th stage permeate compressor SA-K-2631 outlet (26 ESV 307) to 2nd stage Membrane Package discharge including membrane skid 2nd stage bypass	1820-SA3-26-EPR-PID-565;A2631-C03-001(SHT 1/8);A2631-C03-001(SHT 6/8)	9. Lower Level	9.1. failure of the controller 26 LICA 381 causing valve 26 LCV-381 to fully open	9.1.2.1. none	9.1.2.1. Ref. # 2			Process	R			PID 612, A5
133	12	PHASE II: From 4th stage permeate compressor SA-K-2631 outlet (26 ESV 307) to 2nd stage Membrane Package discharge including membrane skid 2nd stage bypass	1820-SA3-26-EPR-PID-565;A2631-C03-001(SHT 1/8);A2631-C03-001(SHT 6/8)	12. Maintenance	12.1. positive isolation of the pretreatment units & individual membrane banks/ no RO in the line	12.1.1.1. none	12.1.1.1. replace globe valve with ball valve	PIL	205	Static(Vendor)/Process	C	Hardware	Globe valve is replaced with Ball valve. Refer to Rev. 2 P&ID of UOP.	18703003-A2631-C03-001 Sheet 2 of 8, Rev 2
134	12	PHASE II: From 4th stage permeate compressor SA-K-2631 outlet (26 ESV 307) to 2nd stage Membrane Package discharge including membrane skid 2nd stage bypass	1820-SA3-26-EPR-PID-565;A2631-C03-001(SHT 1/8);A2631-C03-001(SHT 6/8)	12. Maintenance	12.1. positive isolation of the pretreatment units & individual membrane banks/ no RO in the line		12.1.2.1. provide RO in the start-up lines (for both pretreatment units & the membrane banks)	PIL	206	Static(Vendor)/Process	C	Hardware	RO provided in start-up line. Refer Rev.2 P&ID of UOP.	18703003-A2631-C03-001 Sheet 2 of 8, Rev 2
135	12	PHASE II: From 4th stage permeate compressor SA-K-2631 outlet (26 ESV 307) to 2nd stage Membrane Package discharge including membrane skid 2nd stage bypass	1820-SA3-26-EPR-PID-565;A2631-C03-001(SHT 1/8);A2631-C03-001(SHT 6/8)	12. Maintenance	12.2. additional isolation valve in the common line inlet to the membrane unit	12.2.1.1. isolation on inlet to each membrane unit and start up by pass line	12.2.1.1. remove the isolation valve and replace it with upstream slip plate located in the same line	PIL	207	Static(Vendor)/Process	C	Hardware	Done. Refer Rev.2 P&ID of UOP.	18703003-A2631-C03-001 Sheet 2 of 8, Rev 2
136	12	PHASE II: From 4th stage permeate compressor SA-K-2631 outlet (26 ESV 307) to 2nd stage Membrane Package discharge including membrane skid 2nd stage bypass	1820-SA3-26-EPR-PID-565;A2631-C03-001(SHT 1/8);A2631-C03-001(SHT 6/8)	13. Relief	13.1. external fire to SA-M-2633-S2 & partial blockage of the guard bed	13.1.1.1. none	13.1.1.1. check the relief rate through the guard bed & account for desorbtion rate of the guard bed during relief	PIL	208	Static(Vendor)/Process	C	Review/Study	UOP's relief valve datasheet reviewed & found ok.	-
137	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	1. More Flow	1.1. pigging operation or high water content in slug catcher outlet resulting in high flow of condensate/ water	1.1.1.1. none	1.1.1.1. review impact of increased water flow to 2nd stage separator. Estimated amount of water to be advised by KPC	PIL/ KPC	37	Process	P	Study/Review	KPC Projects to respond to this.	KPC to advise the maximum quatity of water is expected to the slug catcher and the scenarios.
138	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	1. More Flow	1.3. failure of the level controller 20 LIC XXX level control at slug catcher) causing valves to fully open (maximum output from LIC to FIC)	1.3.1.1. DCS diagnostics; 1.3.1.2. 20 TIAL 309/302; 1.3.1.3. 20 LZAHH 312 (node 14); 1.3.1.4. 20 LICAH 309	1.3.1.1. provide input from 20 LZALL XXX (slug catcher) to close 20 ESV 302/ 300	PIL	38	Process	R	Alarm/DCS	Agreed. Cause and Effect will be updated accordingly.	Cause and Effect
139	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	2. Less Flow	2.2. blockages of the tube side of SA-E-2034/2035	2.2.3.1. none	2.2.3.1. review operator's action in the case of low temperature effect in the separator	PIL/ KPC	39	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
140	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	2. Less Flow	2.2. blockages of the tube side of SA-E-2034/2035	2.2.4.1. none	2.2.4.1. review operator's action in the case of low temperature effect in the separator	PIL/ KPC	40	Process	R	Procedure	It will be included in the operating manual.	operating manual

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
141	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	2. Less Flow	2.2. blockages of the tube side of SA-E-2034/2035	2.2.4.1. none	2.2.4.2. review availability of PPD connection in the slug catcher condensate outlet lines and provide them if not already available	KPC	41	KPC	P		Slug catcher PPD injection point in condensate outlet to be considered when detailed design for slug catcher is available.	-
142	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	3. No Flow	3.1. inadvertant closure of manual valves	3.1.1.1. operating guidelines; 3.1.1.2. cannot slam close application ball valves	3.1.1.1. Ref # 7			KPC	P			-
143	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	3. No Flow	3.2. low ambient temperature	3.2.1.1. none	3.2.1.1. review operator's action in the case of low temperature effect in the separator	PIL/ KPC	42	Process	R	Procedure	It will be included in the operating manual.	operating manual
144	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	3. No Flow	3.2. low ambient temperature	3.2.1.1. none	3.2.1.2. Ref # 40			Process	R			operating manual
145	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	3. No Flow	3.5. failure of the control loop hardware of 20 FCV 300/301 causing valve to fully close	3.5.1.1. ESD action; 3.5.1.2. adjusting gas production to process through one train only; 3.5.1.3. 20 LZALL 311 (node 14)	3.5.1.1. review operator's action in the case of failure of the control hardware	PIL/ KPC	43	Process	R	Procedure	It will be included in the operating manual.	operating manual
146	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	3. No Flow	3.6. failure of the control loop hardware 20 FIC 300/301 to causing valve to fully close	3.6.1.1. ESD action; 3.6.1.2. adjusting gas production to process through one train only; 3.6.1.3. 20 LZALL 311 (node 14); 3.6.1.4. DCS diagnostics	3.6.1.1. review operator's action in the case of failure of the controller	PIL/ KPC	44	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
147	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	4. Higher Pressure	4.1. shut down of the train and isolating heat exchanger inlet and outlet (liquid trapped inside piping/ tube bunddle) SA-E-2034/2035 or uninsulated piping sections	4.1.1.1. none	4.1.1.1. calculate pressure rise for condensate in the case of heating up to 105 degree C by hot water and evaluate need for thermal relief device	PIL	45	Process	R	Study/Review	Thermal relief valves are provided for SA-E-2034 / 2035 & 2037 and reflected in the relevant PID's Rev.0.	PID 516, D2 PID 517, D2 PID 519, D2
148	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	4. Higher Pressure	4.1. shut down of the train and isolating heat exchanger inlet and outlet (liquid trapped inside piping/ tube bunddle) SA-E-2034/2035 or uninsulated piping sections	4.1.1.1. none	4.1.1.2. review needs for thermal relief of the uninsulated piping sections part of this node	PIL	46	Process	R	Study/Review	ESV's are provided near to slug catcher, Liquid trapped downstream of ESV's will have protection by new PSV located on exchanger tube side. In addition, the operating manual shall include requirements of depressurizing the line during shutdown or isolation of the line.	operating manual
149	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	5. Lower Pressure	5.1. accidential damage to pipes/valves/equipment	5.1.1.1. F &G system; 5.1.1.2. ESD system	5.1.1.1. Ref # 9			HSE	R			-
150	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	7. Lower Temperature	7.1. failure of the control loop hardware 20-TIC 302/309 causing valves 20 TCV 302/309 to go to safe mode (during winter conditions)	7.1.2.1. none	7.1.2.1. review operator's action in the case of failure of the control hardware	PIL/ KPC	47	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
151	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	7. Lower Temperature	7.2. SA-E-2034/2035 tube side bypass open (inadvertant opening of isolation valve)	7.2.2.1. none	7.2.2.1. Ref # 7			KPC	P			-
152	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	8. instrumentation	8.1. using orifice type flowmeter for condensate (during winter conditions)	8.1.1.1. none	8.1.1.1. review requirements for piping insulation and heat tracing on impulse lines of orifice flow meters	PIL	48	Instrument / Process	R	Study/Review	No more applicable since the flow meters have been changed from the RO types to the vortex as per the Hazop recommendation 8.1.1.2.	-
153	13	PHASE I: From Slug Catcher (SA-V-2034) to 20 FCV-301 and SGT 1&2 inlet manifold	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517	8. instrumentation	8.1. using orifice type flowmeter for condensate (during winter conditions)	8.1.1.1. none	8.1.1.2. review use of orifice flow meters vs. vortex flow meters used on the existing trains condensate lines (also review maintenance needs)	PIL/ KPC	49	Process	C	Study/Review	All condensate flowmeters in this node are changed from the orifice meters to vortex type to satisfy the operation requirements during winter.The changes are reflected on the PIDs Rev.0	PID 516, G3 PID 517, H3
154	14	PHASE I: All condensate feed streams from respective control valves to 2nd stage Separator (SA-V-2032)	1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-24-EPR-PID-544;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581	1. More Flow	1.2. failure of the controller 24 FIC 304 causing valve 24 FCV 304 to fully open	1.2.2.1. none	1.2.2.1. show isolation valves for 24 FCV 304 as normally close valves on the P&ID	PIL	50	Process	R	PID representation	Agreed. It reflected in the PID Rev.0.	PID 544, C4
155	14	PHASE I: All condensate feed streams from respective control valves to 2nd stage Separator (SA-V-2032)	1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-24-EPR-PID-544;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581	1. More Flow	1.2. failure of the controller 24 FIC 304 causing valve 24 FCV 304 to fully open	1.2.2.1. none	1.2.2.2. review operator's action in the case of failure of the controller	PIL/ KPC	51	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
156	14	PHASE I: All condensate feed streams from respective control valves to 2nd stage Separator (SA-V-2032)	1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-24-EPR-PID-544;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581	3. No Flow	3.1. low ambient temperature	3.1.1.1. none	3.1.1.1. provide operating procedures part of operating manual to activate export pump recycle in the case of low temperature of condensate inlet to the 2nd stage separator	PIL/ KPC	52	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
157	14	PHASE I: All condensate feed streams from respective control valves to 2nd stage Separator (SA-V-2032)	1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-24-EPR-PID-544;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581	3. No Flow	3.1. low ambient temperature	3.1.1.1. none	3.1.1.2. provide low temperature alarm off 20 TI 317	PIL	53	Process	R	Alarm/DCS	Agreed. It reflected in the PID Rev.0.	PID 525, C3
158	14	PHASE I: All condensate feed streams from respective control valves to 2nd stage Separator (SA-V-2032)	1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-24-EPR-PID-544;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581	5. Lower Pressure	5.1. accidential damage to pipes/valves/equipment	5.1.1.1. F &G system; 5.1.1.2. ESD system	5.1.1.1. Ref # 9			HSE	R			-
159	14	PHASE I: All condensate feed streams from respective control valves to 2nd stage Separator (SA-V-2032)	1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-24-EPR-PID-544;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581	5. Lower Pressure	5.2. failure of controller 20 PICA 324 causing valve to go to fail safe open condition	5.2.2.1. none	5.2.2.1. Ref # 2			Process	R			PID 612, A5
160	14	PHASE I: All condensate feed streams from respective control valves to 2nd stage Separator (SA-V-2032)	1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-24-EPR-PID-544;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581	8. composition	8.1. increased water content in the condensate discharge from slug catcher	8.1.1.1. 20 LICAH 308	8.1.1.1. Ref # 36			Process	R			-
161	14	PHASE I: All condensate feed streams from respective control valves to 2nd stage Separator (SA-V-2032)	1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-24-EPR-PID-544;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581	9. Higher Level	9.3. failure of controller 20 LICA-308 causing valve 20 LCV-308 to close	9.3.2.1. none	9.3.2.1. review operator's action in the case of failure of the controller	PIL/ KPC	54	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
162	14	PHASE I: All condensate feed streams from respective control valves to 2nd stage Separator (SA-V-2032)	1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-24-EPR-PID-544;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581	11. Maintenance	11.1. ladder access to elevated platforms	11.1.1.1. none	11.1.1.1. 3D model review to confirm two means of escape available for main access platforms (general for trains 3 & 4 platforms)	PIL	55	Piping/HSE	R	Study/Review	Two means of escape available for main access platform.	-
163	15	PHASE I: From 2nd stage Separator (SA-V-2032) to 20 PDCV-345	1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527	6. General	6.1. title of the stabilizer feed pump doesnt reflect pump duty	6.1.1.1. none	6.1.1.1. change the title to desalter fead pumps	PIL	56	Process	R	Others	PIL noted Hazop recommendation, however the existing description is listed in most of the documentation. It will be very difficult to revise these documents now. Any mismatches in future will cause more confusion, then PIL suggest to Keep the Description as it is.	-
164	16	PHASE II: From 20 PDCV-345 to Desalter Vessel (SA-V-2033)	1820-SA3-20-EPR-PID-527	1. More Flow	1.2. failure of controller hardware 20 PDIC-345 causing valve 20 PDCV-345 to go to fail safe mode	1.2.1.1. refer to 1.1.1.2	1.2.1.1. provide low differential pressure alarm from 20-PDIC-345	PIL	209	Static (vendor) / Process	R	Alarm/DCS	Agreed. It is reflected in the PID Rev. 0.	PID 527, F4
165	16	PHASE II: From 20 PDCV-345 to Desalter Vessel (SA-V-2033)	1820-SA3-20-EPR-PID-527	3. No Flow	3.1. failure of controller 20 PDIC-345 causing valve 20 PDCV-345 to fully close	3.1.1.1. DCS diagnostics; 3.1.1.2. 20-LZALL-318; 3.1.1.3. 21-FICAL-302	3.1.1.1. review availability and provide minimum flow mechanical stopper on 20 PDCV 345	PIL	210	Static(Vendor)	R	Review/Study	Mechanical stopper will be provided with mixing valve	PID 427, G3 and C9
166	16	PHASE II: From 20 PDCV-345 to Desalter Vessel (SA-V-2033)	1820-SA3-20-EPR-PID-527	3. No Flow	3.2. by-pass across SA-V-2033 open (inadvertant action)	3.2.1.1. operating procedures for limited time of by-pass during normal operation	3.2.1.1. refer to 1.2.1.1 Ref. 209			Static (vendor) / Process	R			PID 427, G3 and C9

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
167	16	PHASE II: From 20 PDCV-345 to Desalter Vessel (SA-V-2033)	1820-SA3-20-EPR-PID-527	5. Lower Level	5.3. transformer oil leaks from transformer unit	5.3.1.1. 20-LSL-380; 5.3.1.2. thermal relief valve of the transformer unit (vapour relief); 5.3.1.3. thermal overload from MCC	5.3.1.1. update PID to show proper representation of relief valve (tag number)	PIL	211	Static (Vendor) /Process	R	PID representation	Agreed. It is reflected in the PID Rev. 0.	PID 527, B6
168	16	PHASE II: From 20 PDCV-345 to Desalter Vessel (SA-V-2033)	1820-SA3-20-EPR-PID-527	6. General	6.1. no clear presentation of instrumentation/ control/ trip on the PID	6.1.1.1. none	6.1.1.1. update PID to show relevant inputs/ outputs from transformer unit to DCS and OSD	PIL	212	Process / Instrument	R	PID representation	Agreed. It is reflected in the PID Rev. 0.	PID 527, C3
169	16	PHASE II: From 20 PDCV-345 to Desalter Vessel (SA-V-2033)	1820-SA3-20-EPR-PID-527	7. Safety	7.1. High voltage area/ possible exposure to personnel	7.1.1.1. enclosed secondary power system	7.1.1.1. provide safety signs for high voltage system as well as controlled access	PIL	213	HSE	R	Others	Safety signs for high voltage system as well as controlled access are provide. Refer to Safety Signs Layout,1820-SA3-74-EHS-FPE-006, Rev B.	-
170	16	PHASE II: From 20 PDCV-345 to Desalter Vessel (SA-V-2033)	1820-SA3-20-EPR-PID-527	7. Safety	7.2. external fire	7.2.1.1. none	7.2.1.1. review requirements for passive fire protection of SA-V-2033 as per project specifications	PIL	214	HSE	R	Review/Study	Passive fire protection of SA-V-2033 is provided. Refer to Fire Proofing Study Report 1820-SA3-74-EHS-RPT-002,Rev 0.	-
171	16	PHASE II: From 20 PDCV-345 to Desalter Vessel (SA-V-2033)	1820-SA3-20-EPR-PID-527	7. Safety	7.3. catastrophic rupture of desalter vessel	7.3.1.1. none	7.3.1.1. review secondary containment availability and capacity	PIL	215	HSE / Piping / Civil	R	Review/Study	Curb wall with paving provided.	-
172	17	PHASE I: From Desalter Vessel (SA-V-2033) to 20 PDCV-345 and Slug Catcher (SA-V-2034) (updated during PHASE II HAZOP)	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2	1. More Flow	1.1. failure of controller 20 FIC-309 causing valve 20 FCV-309 to fully open	1.1.2.1. 20-LIC-314	1.1.2.1. review effects during HAZOP of node 16 (no significant effects - discussed PHASE II HAZOP)	PIL	57	Process/HSE	R	Review/Study	It was discussed during Phase II HAZOP and the vendor confirmed that no significant effect.	-
173	17	PHASE I: From Desalter Vessel (SA-V-2033) to 20 PDCV-345 and Slug Catcher (SA-V-2034) (updated during PHASE II HAZOP)	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2	2. Less Flow	2.1. suction strainer / piping blockages	2.1.2.1. none	2.1.2.1. provide low flow alarm off 20 FIC 309	PIL	58	Process	R	Alarm/DCS	Agreed. It is reflected in the PID Rev. 0.	PID 528 1/2, B6
174	17	PHASE I: From Desalter Vessel (SA-V-2033) to 20 PDCV-345 and Slug Catcher (SA-V-2034) (updated during PHASE II HAZOP)	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2	2. Less Flow	2.2. partial opening of manual valves	2.2.2.1. none	2.2.2.1. Ref # 57			Process/HSE	R			-
175	17	PHASE I: From Desalter Vessel (SA-V-2033) to 20 PDCV-345 and Slug Catcher (SA-V-2034) (updated during PHASE II HAZOP)	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2	2. Less Flow	2.3. low performance of the pumps (SA-P-2033 A/B)	2.3.1.1. 20 LZAHH 316; 2.3.1.2. 20 LICAH 314	2.3.1.1. review need for 20 PT 316 A/B subject to type of reciprocating pump used (consult vendor as well)	PIL	59	Rotating (Vendor)	R	Study/Review	20PT3316 A/B provided.	PID 528 2/2
176	17	PHASE I: From Desalter Vessel (SA-V-2033) to 20 PDCV-345 and Slug Catcher (SA-V-2034) (updated during PHASE II HAZOP)	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2	2. Less Flow	2.4. low performance of the pumps (SA-P-2032 A/B)	2.4.1.1. none	2.4.1.1. provide operating procedure part of operating manual indicating requirement for increment of water make-up flow in the case of low/ loss performance of pumps (SA-P-2032A/B)	PIL/ KPC	216	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
177	17	PHASE I: From Desalter Vessel (SA-V-2033) to 20 PDCV-345 and Slug Catcher (SA-V-2034) (updated during PHASE II HAZOP)	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2	3. No Flow	3.3. inadvertant closure of manual valves	3.3.1.1. 20 PZALL 349 A/B (SA-P2032 A/B); 3.3.1.2. lock open valves in the pumps suction and discharge; 3.3.1.3. 20 RV 304 A/B (SA-P-2033 A/B)	3.3.1.1. provide high pressure alarm off 20 PI 350	PIL	60	Process	R	Alarm/DCS	Agreed. It is reflected in the PID Rev. 0.	PID 528 2/2, B8
178	17	PHASE I: From Desalter Vessel (SA-V-2033) to 20 PDCV-345 and Slug Catcher (SA-V-2034) (updated during PHASE II HAZOP)	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2	3. No Flow	3.4. failure of controller 20 FIC-309 causing valve 20 FCV-309 to close	3.4.1.1. DCS diagnostics	3.4.1.1. review need for minimum flow mechanical stopper on 20 FCV 309	PIL	61	Process / Inst	R	Hardware	Provided Low alarm on flow controller 20-FIC-309 is sufficient.	PID 528 1/2, B6
179	17	PHASE I: From Desalter Vessel (SA-V-2033) to 20 PDCV-345 and Slug Catcher (SA-V-2034) (updated during PHASE II HAZOP)	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2	3. No Flow	3.4. failure of controller 20 FIC-309 causing valve 20 FCV-309 to close	3.4.2.1. none	3.4.2.1. review effects during HAZOP of node 16 (no significant effect discussed PHASE II HAZOP)	PIL	62	Process	R	Study/Review	It was discussed during Phase II HAZOP and the vendor confirmed that no significant effect.	-
180	17	PHASE I: From Desalter Vessel (SA-V-2033) to 20 PDCV-345 and Slug Catcher (SA-V-2034) (updated during PHASE II HAZOP)	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2	3. No Flow	3.5. failure of the control loop hardware 20 FCV-309 causing valve to go to fail safe mode	3.5.1.1. 20 PZALL 349 A/B (SA-P2032 A/B); 3.5.1.2. 20 LZAHH 316; 3.5.1.3. 20 LICAH 314	3.5.1.1. provide high pressure alarm off 20 PI 350	PIL	63	Process	R	Alarm/DCS	Agreed. It is reflected in the PID Rev. 0.	Repetition with 177-17
181	18	PHASE I: From Desalter (SA-V-2033) and (25 LCV-308) and (21 FCV-305) to Condensate Stabilizer (SA-C-2131)	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-552	4. Higher Pressure	4.1. isolating tube side of the stabilizer feed heater (SA-E-2132) and keeping the hot stabilized oil stream in circulation	4.1.1.1. none	4.1.1.1. check pressure rise for this cause and check whether 21 RV 300 A/B are adequately sized	PIL	64	Process	R	Study/Review	The calculations are performed for this case and found it is adequately sized, hence no changes are required.	-
182	18	PHASE I: From Desalter (SA-V-2033) and (25 LCV-308) and (21 FCV-305) to Condensate Stabilizer (SA-C-2131)	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-552	5. Lower pressure	5.1. failure of controller 21 PICA 319 causing valve 21 PCV 319 to fully open	5.1.2.1. none	5.1.2.1. Ref # 2			Process	R			PID 612, A5
183	18	PHASE I: From Desalter (SA-V-2033) and (25 LCV-308) and (21 FCV-305) to Condensate Stabilizer (SA-C-2131)	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-552	5. Lower pressure	5.2. failure of control loop hardware 21 PCV 319 causing valve 21 PCV 319 to go to fail safe mode open	5.2.2.1. none	5.2.2.1. Ref # 2			Process	R			PID 612, A5
184	18	PHASE I: From Desalter (SA-V-2033) and (25 LCV-308) and (21 FCV-305) to Condensate Stabilizer (SA-C-2131)	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-552	7. Higher Temperature	7.2. failure of the controller 21 FICA 301 causing valve 21 FCV 301 to fully open and plugging feed pan in the column	7.2.1.1. 21 TIAL 320; 7.2.1.2. 21 TIAL 316; 7.2.1.3. DCS diagnostics	7.2.1.1. provide isolation valve and service connection (2") in feed pan outlet to stabilizer reboiler	PIL	65	Process	R	Hardware	Agreed. It is reflected in the PID Rev. 0.	PID 529, F5 PID 530, F5
185	19	PHASE I: From Stabilzer (SA-C-2131) to Condensate Storage Tank (SA-T-2431A)	1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540	3. No Flow	3.2. failure of the control loop hardware of 21 TCV 321 A/B causing both valves to go to fail safe close mode (common mode failure)	3.2.1.1. 21 LICAH 301; 3.2.1.2. 21 LZAHH 308	3.2.1.1. change safe fail mode action of 21 TCV 321 B to open	PIL	66	Process	R	PID representation	Agreed. The safe fail mode action of 21-TCV-321B changed to open. Refer to PID Rev.0.	PID 531, G4
186	19	PHASE I: From Stabilzer (SA-C-2131) to Condensate Storage Tank (SA-T-2431A)	1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540	6. Higher Temperature	6.3. manually by passing/ isolating SA-E-2133	6.3.1.1. 41 FQAH 302; 6.3.1.2. 21 TICAH 346; 6.3.1.3. 21 TICAH 337	6.3.1.1. check continous operation of the SA-E-2135 for the inlet condensate temperature of 107 degree C has no impact on equipment	PIL	67	Process	R	Study/Review	Design temperature of Gas/Condensate exchange (SA-E-2135) is now revised to 150 C, so there is no problem of continuous operation of condensate at 107C.	-
187	19	PHASE I: From Stabilzer (SA-C-2131) to Condensate Storage Tank (SA-T-2431A)	1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540	8. Sampling	8.1. cannot sample common stream for SGT 3&4	8.1.1.1. none	8.1.1.1. provide sample point down stream of SA-V-2431 in common line at ground level	PIL	68	Process	R	Hardware	Agreed. It is reflected in the PID Rev. 0.	PID 540, F3
188	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	1. More Flow	1.1. failure of controller 24 FICA-305 causing valve 24 FCV-305 to fully open and no export from Salam oil plant (no back pressure in the export pipe line)	1.1.1.1. DCS diagnostics; 1.1.1.2. 24 PIAL 306; 1.1.1.3. 24 PIAL 301 A/B/C	1.1.1.1. advise minimum back pressure required at TP SG3-02 to operate export pumps at maximum safe flow. Review available back pressure at the plant	PIL/ KPC	69	Process	P	Study/Review	Awaiting KPC reply.	KPC to provide the minimum back pressure at condensate tie-in point
189	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	1. More Flow	1.1. failure of controller 24 FICA-305 causing valve 24 FCV-305 to fully open and no export from Salam oil plant (no back pressure in the export pipe line)	1.1.1.1. DCS diagnostics; 1.1.1.2. 24 PIAL 306; 1.1.1.3. 24 PIAL 301 A/B/C	1.1.1.2. operating manual / guidlines to reflect minimum back pressure requirement	PIL/ KPC	70	Process	R	Procedure	It will be reflected in the operating manual.	operating manual
190	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	1. More Flow	1.1. failure of controller 24 FICA-305 causing valve 24 FCV-305 to fully open and no export from Salam oil plant (no back pressure in the export pipe line)	1.1.1.1. DCS diagnostics; 1.1.1.2. 24 PIAL 306; 1.1.1.3. 24 PIAL 301 A/B/C	1.1.1.3. check if over current protection is available for the export pumps	PIL	71	Process / Electrical	R	Study/Review	Overcurrent protection provided for the motors.	-
191	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	1. More Flow	1.1. failure of controller 24 FICA-305 causing valve 24 FCV-305 to fully open and no export from Salam oil plant (no back pressure in the export pipe line)	1.1.1.1. DCS diagnostics; 1.1.1.2. 24 PIAL 306; 1.1.1.3. 24 PIAL 301 A/B/C	1.1.1.4. provide high flow alarm off 24 FICA 301 A/B/C	PIL	72	Process	R	Alarm/DCS	Agreed. It is reflected in the PID Rev. 0.	PID 544, E2
192	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	4. Reverse flow	4.2. pump discharge line check valve passing and corresponding pump stops	4.2.1.1. none	4.2.1.1. provide alarm for open position off 24 ZS 306 A/B/C if corresponding pump is not running	PIL	73	Process	R	PID representation	Agreed. It is reflected in the PID Rev. 0.	PID 544, F1 and D9

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
193	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	5. Higher Pressure	5.3. locking condensate in export pump loop	5.3.1.1. none	5.3.1.1. check thermal relief requirements for isolated sections of pipework	PIL	74	Process	R	Study/Review	The volume of each pump loop is within the maximum allowable block in volume hence no thermal relief valve is required.	-
194	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	8. Lower Level	8.1. operating pumps in manual mode	8.1.1.1. 24 LZALL 205; 8.1.1.2. 24 LIAL 004	8.1.1.1. export pump operation logic to include that only one tank outlet and recycle valve can be open at any time (provide alarm for deviating from this event)	PIL	75	Process / Inst	R	Alarm/DCS	Provided. Refer PID rev.0.	PID 544, E3, E4 and E6
195	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	8. Lower Level	8.1. operating pumps in manual mode	8.1.1.1. 24 LZALL 205; 8.1.1.2. 24 LIAL 004	8.1.1.2. apply the same logic from train 3 & 4 to train 1 & 2	KPC	76	Process / Inst	R	Study/Review	The SGT 3&4 condensate export pump operating and trip logic differs from that of SGT 1&2. It was considered that the SGT 3&4 logic offers a higher level of safeguarding for the operation and would be applicable to 1&2. Accordingly the logic changes should be applied via KPC normal change control protocols and implemented in due course.	-
196	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	9. Contamination	9.1. corrosion products/ fine sand particles carry over / wax	9.1.1.1. regular inspection/ maintenance on the tanks	9.1.1.1. review ways of reducing sludge accumulation at the bottom of the tanks. Use current operational experience in determining the sludge accumulation rate.	PIL/ KPC	77	Process	C	Study/Review	Sludge accumulation can realistically only be dealt with as at present, ie regular (bi-annual) cleanout and inspection. Tank jetting systems were discussed during the hazop but discounted as being unjustifiably expensive and ineffective in tanks of this size.	-
197	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	10. Corrosion	10.1. internal corrosion in the tank	10.1.2.1. see low flow strainer blockages (node 20)	10.1.2.1. review requirements for internal coating of the entire tank	PIL/ KPC	78	Process	R	Study/Review	The anti-corrosion coating applied over the entire condensate storage tanks.	1820-SA3-24-EPR-DPS-076 Rev. 0
198	20	PHASE I: From Condensate Storage Tank (SA-T-2431A) to Condensate Export line	1820-SA3-10-EPR-PID-509;1820-SA3-24-EPR-PID-540;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544	11. Safety	11.1. accidential damage to pipes/valves/equipment	11.1.1.1. none	11.1.1.1. consequence modeling to advice if the gas detection is required for condensate storage/ export pump area (based on the results of the modeling)	PIL	79	HSE	R	Study/Review	Consequence modeling is done,based on the results of the modeling;gas release scenario is not a credible scenario for such case, however UV/IR flame detectors are provided to monitor the area and activate control action in case of fire scenario.	operating manual
199	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	1. More Flow	1.2. failure of 25 PDIA 301 causing 25 ESV 300 to open during startup conditions	1.2.1.1. 25 ESV 300 position alarm	1.2.1.1. operating procedures part of operating manual to address trouble shooting requirements for failure of 25 PDIA 301	PIL	217	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
200	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	2. Less Flow	2.1. partial opening of manual valves	2.1.1.1. 25 PICA 300; 2.1.1.2. 25 PICA 309; 2.1.1.3. 25 PICAL 300; 2.1.1.4. 25 PICAL 309; 2.1.1.5. 25 FIAL 300; 2.1.1.6. 25 FIAL 301	2.1.1.1. remove alarm functions from 25 PIA 312 (low flow alarm and low low pressure trip available as well as controller 25 PICA 309)	PIL	80	Process	R	Alarm/DCS	Agreed. It is reflected in The PID Rev.0 .	PID 552, E5
201	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	2. Less Flow	2.4. failure of 21 PICA 319 causing valve to 21 PCV 319 to fully open	2.4.1.1. DCS diagnostics; 2.4.1.2. 25 PICAL 300; 2.4.1.3. 25 FIAL 300	2.4.1.1. Ref # 2			Process	R			PID 612, A5
202	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	2. Less Flow	2.5. failure of hardware in a control loop of 21 PICA 319 causing valve 21-PCV-319 to go to fail safe open mode	2.5.1.1. 25 PICAL 300; 2.5.1.2. 25 FIAL 300	2.5.1.1. Ref # 2			Process	R			PID 612, A5
203	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	2. Less Flow	2.6. failure of controller 25 PICA 300 causing valve 25 PCV 300 to fully open	2.6.2.1. DCS diagnostics; 2.6.2.2. 21 PICAH 319	2.6.2.1. Ref # 2			Process	R			PID 612, A5
204	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	2. Less Flow	2.7. failure of controller 25 PICA 309 causing valve 25 PCV 309 to fully open	2.7.2.1. 21 PICAH 319	2.7.2.1. Ref # 2			Process	R			PID 612, A5
205	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	2. Less Flow	2.9. restrictions/ reduction of N2 supply to the compressors' 1/2 packing	2.9.1.1. 25 PIAL 3350; 2.9.1.2. venting to safe location out side compressor shelter	2.9.1.1. review hazardous area classification of N2 vent area	PIL	218	HSE	R	Review/Study	Considered, Refer note no. 9 (all vents will be treated as zone 1) in Hazardous Area Classification Layout,Doc. No.1820-SA3-74-EHS-HAC-001,Rev 0.	-
206	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	3. No Flow	3.1. inadvertant closure of manual valves	3.1.3.1. 21 PICAH 319	3.1.3.1. Ref # 2			Process	R			PID 612, A5
207	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	3. No Flow	3.2. failure of 25 TICA 313 causing both valves 25 TCV 313 A/B to fully close	3.2.2.1. 21 PICAH 319	3.2.2.1. Ref # 2			Process	R			PID 612, A5
208	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	3. No Flow	3.4. loss of N2 supply to the compressors' 1/2 packing	3.4.1.1. 25 PIAL 3350; 3.4.1.2. venting to safe location out side compressor shelter	3.4.1.1. refer to 2.9.1.1 Ref 218			HSE	R			-
209	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	5. Lower Pressure	5.3. accidential damage to pipes/valves/equipment	5.3.1.1. F &G system; 5.3.1.2. ESD system; 5.3.1.3. 25 PZALL 302/311; 5.3.1.4. 25 PICAL 300/309	5.3.1.1. Ref # 9			HSE	R			-
210	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	6. Higher Temperature	6.3. motor selection in manual/fail to start when required	6.3.1.1. refer to 6.2.1.1 to 6.2.1.3; 6.3.1.2. refer to 6.2.2.1; 6.3.1.3. 25 HS 302/303 (local start)	6.3.1.1. provide operating procedures to start motors from the field in the case of failure to start from DCS (common for all of the fin fan coolers in the plant)	PIL/ KPC	219	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
211	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	7. Lower Temperature	7.1. low ambient temperature during start up	7.1.2.1. 25 TIAL 308; 7.1.2.2. 25 TICAL 313; 7.1.2.3. 25 FIAL 304	7.1.2.1. provide Methanol Injection Point (MIP) upstream SA-E-2531 and for SA-E-2532 after by pass take off point	PIL	81	Process	R	Hardware	Agreed. It is reflected in The PID Rev.0 .	PID 551, D2 PID 552, C7
212	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	9. Maintenance	9.1. not using N2 purging of the motor during start up	9.1.1.1. connection available	9.1.1.1. provide operating procedure part of operating manual for using N2 purging of the motor during start up (applicable to permeate compressor motor)	PIL/ KPC	220	Rotating (vendor) /Process	R	Procedure	N2 connection is already provided.	-
213	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	10. Safety	10.1. Available access to the lower section of the coupling	10.1.1.1. none	10.1.1.1. review requirements for full protection for coupling access as per existing SGT-1&2	PIL	221	Rotating(vendor)/HSE	R	Study/Review	Modified flywheel cover (full cover) will be applied.	Civil to take care for support.
214	21	PHASE II: From Stabilizer (SA-C-2131) and 21 ESV-302 and 2nd stage Separator (SA-V-2032) to 25 ESV-302	1820-SA3-20-EPR-PID-525;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-551;1820-SA3-25-EPR-PID-552	11. Static	11.1. build-up of static by machinery rotation	11.1.1.1. none	11.1.1.1. provide earthing arrangement for compressor SA-K-2531 system	PIL	222	Rotating (vendor)/Electrical	R	Study/Review	Earthing terminals are provided on motors, terminal boxes of the motors, Compressor frame, heater assembly, package assemblies such as coolers / radiators etc.	18703005/8-K-2531/41-B01-001 Rev. 4
215	22	PHASE I: From 28 LCV-303 and 28 LCV-300 to 21 ESV-302	1820-SA3-21-EPR-PID-532;1820-SA3-28-EPR-PID-590	3. Higher Temperature	3.1. low level in the SA-V-2131 / failure of the controller 21 TICA 351 to cause heater to stay online	3.1.1.1. DCS Diagnostics; 3.1.1.2. 21 TZAHH 350; 3.1.1.3. built in equipment overheat protection	3.1.1.1. confirm 21 TZAHH 350 trips the heater directly through heater thyristor control panel	PIL	82	Process	R	Alarm/DCS	Agreed. Cause and Effect has been updated accordingly.	Cause and Effect
216	22	PHASE I: From 28 LCV-303 and 28 LCV-300 to 21 ESV-302	1820-SA3-21-EPR-PID-532;1820-SA3-28-EPR-PID-590	3. Higher Temperature	3.1. low level in the SA-V-2131 / failure of the controller 21 TICA 351 to cause heater to stay online	3.1.1.1. DCS Diagnostics; 3.1.1.2. 21 TZAHH 350; 3.1.1.3. built in equipment overheat protection	3.1.1.2. relocate 21 TZAHH 350 to position between heater outlet and isolation valve	PIL	83	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 532, F8

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
217	22	PHASE I: From 28 LCV-303 and 28 LCV-300 to 21 ESV-302	1820-SA3-21-EPR-PID-532;1820-SA3-28-EPR-PID-590	3. Higher Temperature	3.1. low level in the SA-V-2131 / failure of the controller 21 TICA 351 to cause heater to stay online	3.1.1.1. DCS Diagnostics; 3.1.1.2. 21 TZAHH 350; 3.1.1.3. built in equipment overheat protection	3.1.1.3. provide LL flow DCS interlock off 21 FICA 305 to trip the heater	PIL	84	Process	R	Alarm/DCS	Agreed. It is reflected in The PID Rev.0 .	PID 532, F5
218	22	PHASE I: From 28 LCV-303 and 28 LCV-300 to 21 ESV-302	1820-SA3-21-EPR-PID-532;1820-SA3-28-EPR-PID-590	6. Lower Level	6.1. failure of 21 FICA-305 causing valve 21 FCV 305 to fully open	6.1.2.1. 21 PZAHH 320; 6.1.2.2. 21 RV 301 A/B	6.1.2.1. Ref # 2			Process	R			PID 612, A5
219	22	PHASE I: From 28 LCV-303 and 28 LCV-300 to 21 ESV-302	1820-SA3-21-EPR-PID-532;1820-SA3-28-EPR-PID-590	6. Lower Level	6.2. failure of 28 LICA 303 causing valve 28 LCV 303 to fully open	6.2.2.1. 21 PZAHH 320; 6.2.2.2. 21 RV 301 A/B	6.2.2.1. Ref # 2			Process	R			PID 612, A5
220	22	PHASE I: From 28 LCV-303 and 28 LCV-300 to 21 ESV-302	1820-SA3-21-EPR-PID-532;1820-SA3-28-EPR-PID-590	6. Lower Level	6.3. failure of 28 LICA 300 causing valve 28 LCV 300 to fully open	6.3.2.1. 21 PZAHH 320; 6.3.2.2. 21 RV 301 A/B	6.3.2.1. Ref # 2			Process	R			PID 612, A5
221	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	2. No Flow	2.1. inadvertant closure of isolation valves on seal gas lines	2.1.1.1. refer to 1.1.1.1; 2.1.1.2. refer to 1.1.1.2; 2.1.1.3. operating procedures	2.1.1.1. provide operating procedure part of operating manual to shut down the machine in the case of low pressure alarms in the seal gas alarms	PIL/ KPC	223	Rotating (vendor)/process	R	Procedure	Vendor confirmed that it shall be included in vendor's Operating Manual.	New Node
222	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	2. No Flow	2.1. inadvertant closure of isolation valves on seal gas lines	2.1.2.1. refer to 1.1.1.1; 2.1.2.2. refer to 1.1.1.2	2.1.2.1. provide low temperature alarm from 28 TI 358	PIL	224	Rotating (vendor)/process	R	Alarm/DCS	Vendor incorporated high & low temperature alarm on transmitter 28-TT-3358 in revision - 2 P&ID (P&ID no. - GER315D3 Sheet 1/2).	New Node PID GER315D3 sht 1/2
223	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	2. No Flow	2.2. inadvertant closure of isolation valves on N2 system	2.2.1.1. 28 PIA 321	2.2.1.1. provide operating procedures part of operating manual to indicate steps of T.EX. machine purging (use of proper instrumentation and vent points)	PIL/ KPC	225	Rotating (vendor)/process	R	Procedure	Vendor confirmed that it shall be included in vendor's Operating Manual.	New Node
224	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	3. Reverse Flow	3.1. inadvertant opening/ failure to close N2 supply isolation valve	3.1.1.1. none	3.1.1.1. provide hose connection with non return valve for N2 purging (no permanent piping connection between N2 supply and the machine)	PIL	226	Rotating (vendor)/process	R	Hardware	N2 purging connection with hose and non return valve is provided. Please refer 1820-SA3-28-EPR-PID-591 (Rev-1)	New Node PID GER315D3 sht 1/2
225	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	3. Reverse Flow	3.1. inadvertant opening/ failure to close N2 supply isolation valve	3.1.1.1. none	3.1.1.2. refer to 2.2.1.1 Ref. 225			Rotating (vendor)/process	R			New Node PID GER315D3 sht 1/2
226	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	6. Lower Temperature	6.1. start up/ holding conditions for seal gas system (JT effect across 28 PDCV 325) and failure of the controller 28-TIC-367 to switch on the heater element	6.1.1.1. 28 TIAL 365 (cold gas)	6.1.1.1. provide start-up permissive input from 28 TIAL 365 (abort start up sequence in this event)	PIL	227	Rotating (vendor)	R	Vendor PLC	Vendor confirmed that this will be included in Start-Up Sequence Procedure.	New Node
227	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	6. Lower Temperature	6.1. start up/ holding conditions for seal gas system (JT effect across 28 PDCV 325) and failure of the controller 28-TIC-367 to switch on the heater element	6.1.1.1. 28 TIAL 365 (cold gas)	6.1.1.2. review condensate generation across 28 PDCV 325 due to JT effect and review design of the heater accordingly	PIL	228	Rotating (vendor)/process	R	Study / Review	Vendor provided Knock-Out Pot downstream of 28-PCV-3325 in the revision-2 P&ID (P&ID no. - GER315D3 Sheet 1/2).	New Node
228	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	6. Lower Temperature	6.1. start up/ holding conditions for seal gas system (JT effect across 28 PDCV 325) and failure of the controller 28-TIC-367 to switch on the heater element	6.1.1.1. 28 TIAL 365 (cold gas)	6.1.1.3. review need for condensate drainage system downstream 28 PDCV 325	PIL	229	Rotating (vendor)	R	Study / Review	Vendor confirmed that Knock-Out Pot shall be provided.	New Node
229	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	6. Lower Temperature	6.2. start up/ holding conditions and low ambient temperature during winter conditions	6.2.1.1. none	6.2.1.1. review need for seal gas piping insulation to prevent condensation downstream the heater	PIL	230	Rotating (vendor)/process	R	Study / Review	Vendor confirmed that insulation is not required as seal gas heater is provided.	New Node
230	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	7. Higher Level	7.1. start up sequence aborted before/ during drainage	7.1.1.1. PLC start up sequence abort alarm	7.1.1.1. provide abort alarm in the DCS	PIL	231	Rotating (vendor) / Process Instrument	R	Alarm/DCS	Vendor confirmed that abort alarm provided and the same is considered in the DCS also.	New Node
231 B	23	PHASE II: Turbo Expander Package seal gas, N2, IA	GER315D3 sht 1/2 -vendor drawing;GER315D3 sht 2/2 -vendor drawing	8. Lower Level	8.1. draining machine with no/ low condensate level	8.1.1.1. none	8.1.1.1. advice gas flow rate during drainage and check HP / LP interface for these conditions	PIL	232	Rotating (vendor) / Process	C	Study / Review	DCN issued for providing RO at outlet of drain line.	New Node, JI-187030010A2831-C03-001-C. 1D
232	24	PHASE I: HP Flare system	1820-SA3-20-EPR-PID-315;1814-SA-41-DW-P-412;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-612;1820-SA3-41-EPR-PID-613;1820-SA3-52-EPR-PID-640	1. More Flow	1.1. operating all trains (1 to 4) on one HP Flare system during start up of trains 3 & 4	1.1.1.1. trains 1 & 2 flare jump over is isolated and blinded before commissioning of train 3 & 4	1.1.1.1. repair of trains 1 & 2 HP Flare shall be carried out and completed before commissioning of train 3 & 4. Isolate train 1 & 2 from trains 3 & 4 flare system prior to commissioning train 3 & 4.	KPC	85	KPC	P			-
233	24	PHASE I: HP Flare system	1820-SA3-20-EPR-PID-315;1814-SA-41-DW-P-412;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-612;1820-SA3-41-EPR-PID-613;1820-SA3-52-EPR-PID-640	1. More Flow	1.1. operating all trains (1 to 4) on one HP Flare system during start up of trains 3 & 4	1.1.1.1. trains 1 & 2 flare jump over is isolated and blinded before commissioning of train 3 & 4	1.1.1.2. provide comment on the P&ID that trains 3 & 4 HP Flare system is sized for load of two trains only.	PIL	86	Process	R	Others	Agreed. Note added to the PID Rev.0.	PID 612, C9

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
234	24	PHASE I: HP Flare system	1820-SA3-20-EPR-PID-315;1814-SA-41-DW-P-412;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-612;1820-SA3-41-EPR-PID-613;1820-SA3-52-EPR-PID-640	3. No Flow	3.1. inadvertant closure of manual valves (discharge side)	3.1.1.1. 41 FIAL 305	3.1.1.1. Ref # 7			KPC	P			-
235	24	PHASE I: HP Flare system	1820-SA3-20-EPR-PID-315;1814-SA-41-DW-P-412;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-612;1820-SA3-41-EPR-PID-613;1820-SA3-52-EPR-PID-640	3. No Flow	3.4. inadvertant closure of individual trains inlet to SA-V-4131	3.4.1.1. isolation required for the start up conditions (monitor by procedure)	3.4.1.1. provide lock open valves for the valves inlet to SA-V-4131	PIL	87	Process	R	PID representation	Lock open valves are provided.	PID 612, Rev. 1
236	24	PHASE I: HP Flare system	1820-SA3-20-EPR-PID-315;1814-SA-41-DW-P-412;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-612;1820-SA3-41-EPR-PID-613;1820-SA3-52-EPR-PID-640	4. higher Pressure	4.1. activation of 41 ESV 300 and isolating pump discharge manual valves	4.1.1.1. none	4.1.1.1. provide lock open valves on the pump discharge side	PIL	88	Process	R	Hardware	Agreed. It is reflected in The PID Rev.0 .	PID 612, F4 and F8
237	24	PHASE I: HP Flare system	1820-SA3-20-EPR-PID-315;1814-SA-41-DW-P-412;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-612;1820-SA3-41-EPR-PID-613;1820-SA3-52-EPR-PID-640	7. Higher Level	7.2. plant shut down conditions and level build up in the SA-V-4131	7.2.1.1. none	7.2.1.1. provide logic interlock to avoid tripping the pumps on OSD1 generated by 41 LZAHH 303/304/305	PIL	89	Process / Inst	R	Alarm/DCS	The Cause and Effect has been updated accordingly.	Cause and Effect

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
238	24	PHASE I: HP Flare system	1820-SA3-20-EPR-PID-315;1814-SA-41-DW-P-412;1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-571;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-812;1820-SA3-41-EPR-PID-613;1820-SA3-52-EPR-PID-640	9. Safety	9.1. external fire	9.1.1.1. none	9.1.1.1. review requirements for PFP based on maximum operating level in the vessel (pump start level)	PIL	90	HSE	R		Requirements for PFP based on maximum operating level in the vessel (pump start level) is reviewed. Please refer to Fire Exposed Envelope Layout, Doc. No. 1820-SA374-EHS-PFP-031 which is modified accordingly .	-
239	25	PHASE I: LP Flare System	1814-SA-41-DW-P-413;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-613	1. More Flow	1.1. operating all trains (1 to 4) on one LP Flare system during start up of trains 3 & 4	1.1.1.1. trains 1 & 2 flare jump over is isolated and blinded before commissioning of train 3 & 4	1.1.1.1. repair of trains 1 & 2 LP Flare shall be carried out and completed before commissioning of train 3 & 4. Isolate train 1 & 2 from trains 3 & 4 flare system prior to commissioning train 3 & 4.	KPC	91	KPC	P			-
240	25	PHASE I: LP Flare System	1814-SA-41-DW-P-413;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-613	1. More Flow	1.1. operating all trains (1 to 4) on one LP Flare system during start up of trains 3 & 4	1.1.1.1. trains 1 & 2 flare jump over is isolated and blinded before commissioning of train 3 & 4	1.1.1.2. provide comment on the P&ID that trains 3 & 4 LP Flare system is sized for load of two trains only.	PIL	92	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 613, D9
241	25	PHASE I: LP Flare System	1814-SA-41-DW-P-413;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-613	5. Higher Level	5.1. failure of the instrument 41 LT 307 causing build up of condensate in the drainage boot/ flooding LP line to the flare stack	5.1.1.1. none	5.1.1.1. provide pressure indication and alarm high off 41 PT 302 ,in DCS	PIL	93	Process	R	Alarm/DCS	Agreed. It is reflected in The PID Rev.0 .	PID 613, F6
242	25	PHASE I: LP Flare System	1814-SA-41-DW-P-413;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-613	5. Higher Level	5.1. failure of the instrument 41 LT 307 causing build up of condensate in the drainage boot/ flooding LP line to the flare stack	5.1.1.1. none	5.1.1.2. review arrangement of the draining boot & the seal in regards to possible blockages vs. providing seal between LP flare and the open drain system (check elevations in the system in regards to possibility to provide dedicated drain line to the existing open drain pit or increase seal diameter/ drain valve size)	PIL	94	Process	R	Study/Review	The seal diameter and the drain valve size are increased to 6" and 2" consequentively and the PID Rev.0 updated accordingly.	PID 613, H5
243	25	PHASE I: LP Flare System	1814-SA-41-DW-P-413;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-613	5. Higher Level	5.1. failure of the instrument 41 LT 307 causing build up of condensate in the drainage boot/ flooding LP line to the flare stack	5.1.2.1. none	5.1.2.1. provide operating procedures to drain the boot in the case of 41 LT 307 failure. Procedure to include regular maintenance to draining of the boot is required regardless of the level in the boot	PIL/ KPC	95	Process	R	Procedure	It will be included in the operating manual.	operating manual
244	25	PHASE I: LP Flare System	1814-SA-41-DW-P-413;1820-SA3-24-EPR-PID-540;1820-SA3-25-EPR-PID-550;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-613	6. Service Failure	6.1. pilot gas supply during temporary use of new LP/HP Flare system (train 3 & 4) for trains 1 & 2	6.1.1.1. none	6.1.1.1. provide temporary LP fuel gas connection between flare igition panels of SGT 1 & 2 and SGT 3 & 4	PIL/ KPC	96	Process	R	Hardware	Agreed. It is reflected in The PID Rev.0 .	PID 613, E2
245	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	1. Less Flow	1.1. drain lines blockages (sand and debris)	1.1.1.1. none	1.1.1.1. provide adequate ROD out connections on main drain headers and close proximity to each area sump and individual lines where practicable	PIL	97	Process	R	Hardware	Agreed. Note added to the PID Rev.0.	PID 640, D9
246	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	1. Less Flow	1.2. open drains water pump discharge line blockages (fine particles and corrosion products)	1.2.1.1. level alarm 52 LIAH 300; 1.2.1.2. 52 LZAHH 302	1.2.1.1. 52 LZAHH 302 is not used for OSD duty. Change it to LIAHH 302 in design and on P&ID	PIL	98	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 640, E5
247	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	1. Less Flow	1.3. partial opening of manual valves on the recovered oil pump	1.3.1.1. level alarm 52 LIAH 305; 1.3.1.2. 52 LZAHH 303	1.3.1.1. provide lock open valves on the pump discharge lines	PIL	99	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 640, D8 and D7
248	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	2. No Flow	2.1. fail safe close action of 52 ESV 300	2.1.2.1. pump minimum flow line	2.1.2.1. review manufacturer's recommendation for pump minimum flow/ need for pump minimum flow line back to the sump. If line not provided, provide discrepency alarm of 52 ESV 300 to stop the pumps	PIL	100	Process	R	Study/Review	Minimum recycling flow for the pumps are required and will be provided, hence discrepency alarm is not required.	-
249	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	3. Reverse Flow	3.1. condensate reverse flow from condensate tank gas boot to recovered oil pump discharge	3.1.1.1. none	3.1.1.1. provide pump logic interlock to close 52 ESV 300 when both pumps stopped	PIL	101	Process	R	Alarm/DCS	Agreed. Cause and Effect will reflect it.	Cause and Effect
250	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	4. Lower Temperature	4.1. low ambient temperature	4.1.1.1. over current protection of the motor	4.1.1.1. check over current protection is available for maximum viscosity (as advised by vendor)	PIL	102	Process / Electrical	R	Study/Review	The over current protection is available as confirmed by the vendor.	-
251	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	8. Corrosion	8.1. stagnating water in the pump discharge lines	8.1.1.1. none	8.1.1.1. review use of plastic piping (GRE) for pump discharge lines (under ground sections)	PIL	103	Process / Piping	R	Hardware	Agreed. It is reflected in The PID Rev.0 .	PID 640, C5
252	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	8. Corrosion	8.1. stagnating water in the pump discharge lines	8.1.2.1. none	8.1.2.1. Ref # 98			Process	R			PID 640, E5
253	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	9. Safety	9.1. continuous presence of hydrocarbons in the pit compartments	9.1.1.1. hazardous area classification drawings	9.1.1.1. review classification of compartments in regards to possibility of continuous presence of pure hydrocarbons	PIL	104	HSE	R	Review/Study	Please refer to Rev O:Hazardous Area Classification Layout,1820-SA3-74-EHS-HAC-001.	-
254	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	9. Safety	9.1. continuous presence of hydrocarbons in the pit compartments	9.1.2.1. none	9.1.2.1. review alternative location of the pit in regards to occupational health threshold limit values required by local regulations	PIL	105	Piping/HSE	R	Review/Study	Location of the pit is east of the salam gas trains 3&4 which is logical, in case of any HC fumes it will escape to the prevailing wind (down wind).	-
255	26	PHASE I: Open Drain System	1820-SA3-20-EPR-PID-527;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-540;1820-SA3-52-EPR-PID-640;1820-SA3-52-EPR-PID-644	10. Service Failure	10.1. non availability of plant air in the open drain pit area	10.1.1.1. none	10.1.1.1. provide plant air connection in close proximity	PIL	106	Process / Piping	R	Hardware	Agreed. It is reflected in The PID Rev.0 .	PID 640

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
256	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	1. More Flow	1.1. draining process equipment during upset conditions having high flowrate	1.1.1.1. 52 LICAH 308; 1.1.1.2. 41 LIAH 307; 1.1.1.3. duty pump start	1.1.1.1. provide HH alarm off 52 LICAH 308 interlocked to start stand by pump	PIL	107	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 640, D9
257	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	1. More Flow	1.1. draining process equipment during upset conditions having high flowrate	1.1.2.1. none	1.1.2.1. Ref # 102			Process / Electrical	R			-
258	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	2. Less Flow	2.1. partial opening of manual valves on the closed drains pump SA-P-5233 A/B	2.1.1.1. 52 LICAH 308	2.1.1.1. provide lock open valves on the pump discharge line	PIL	108	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 642, D5
259	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	2. Less Flow	2.1. partial opening of manual valves on the closed drains pump SA-P-5233 A/B	2.1.1.1. 52 LICAH 308	2.1.1.2. Ref # 102			Process / Electrical	R			-

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
260	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	3. No Flow	3.1. inadvertant closure of pump discharge manual valves	3.1.2.1. 52 LICAH 308	3.1.2.1. provide lock open valves on the pump discharge line	PIL	109	Process	R	PID representation	Agreed. It is reflected in The PID Rev.0 .	PID 642, E4
261	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	3. No Flow	3.1. inadvertant closure of pump discharge manual valves	3.1.2.1. 52 LICAH 308	3.1.2.2. Ref # 102			Process/Electrical	R			-
262	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	4. Higher Pressure	4.1. inadvertant opening of the drain line manual valves	4.1.1.1. LZALL alarms on process vessels (only for vessel drains); 4.1.1.2. 41 FQIAH 302	4.1.1.1. provide pressure transmitter and high pressure alarm on the closed drain drum SA-V-5233	PIL	110	Process	R	Hardware	Agreed. It is reflected in The PID Rev.0 .	PID 642, E4
263	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	5. Higher Temperature	5.1. draining hot process fluids during plant upset conditions	5.1.1.1. none	5.1.1.1 operating procedures to indicate requirement to cool down the content of stabilizer reboiler vessels before draining it to closed drain drum SA-V-5233	PIL/ KPC	111	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
264	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-584;1820-SA3-26-EPR-PID-585;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	6. Lower Temperature	6.1. low ambient temperature (during winter)	6.1.1.1. over current protection of the motor	6.1.1.1. check over current protection is available for maximum viscosity (as advised by vendor)	PIL	112	Process / Electrical	R	Study/Review	The vendor confirmed that the pump will be provided by an over current protection which will trip the pump.	-
265	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-584;1820-SA3-26-EPR-PID-585;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	7. Composition	7.1. pumping water out of the closed drain drum	7.1.1.1. none	7.1.1.1. update process data sheet for water pump out requirements and accordingly select the pump for the duty	PIL	113	Process	R	Study/Review	The pump is sized for specific gravity equal to one and the process data sheet updated accordingly.	-
266	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	8. Higher Level	8.2. failure of the duty pump to start when required by 52 LICA 308	8.2.1.1. 52 LICAH 300; 8.2.1.2. start of stand by pump; 8.2.1.3. discrepency alarm	8.2.1.1. Ref # 102			Process/Electrical	R			-
267	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	8. Higher Level	8.3. stand by pump out of service	8.3.1.1. 52 LICAH 300	8.3.1.1. provide additional 2" nozzle in the tank with a dip pipe for a portable pump connection	PIL	114	Process	R	Hardware	Agreed. It is reflected in the PID Rev.0.	PID 642, F7

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
268	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	10. Service Failure	10.1. non availability of plant air in the closed drain pit area	10.1.1.1. none	10.1.1.1. provide plant air connection in close proximity	PIL	115	Process / Piping	R	Hardware	Agreed. It is reflected in the PID Rev.0.	PID 642
269	27	PHASE I: Closed Drain System	1820-SA3-20-EPR-PID-315;1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-515;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-20-EPR-PID-520;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-526;1820-SA3-20-EPR-PID-527;1820-SA3-20-EPR-PID-528/SHT1;1820-SA3-20-EPR-PID-528/SHT2;1820-SA3-21-EPR-PID-529;1820-SA3-21-EPR-PID-530;1820-SA3-21-EPR-PID-531;1820-SA3-21-EPR-PID-532;1820-SA3-21-EPR-PID-533;1820-SA3-24-EPR-PID-541;1820-SA3-24-EPR-PID-542;1820-SA3-24-EPR-PID-543;1820-SA3-24-EPR-PID-343;1820-SA3-24-EPR-PID-544;1820-SA3-25-EPR-PID-550;1820-SA3-25-EPR-PID-552;1820-SA3-26-EPR-PID-560;1820-SA3-26-EPR-PID-561;1820-SA3-26-EPR-PID-562;1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564;1820-SA3-26-EPR-PID-565;1820-SA3-27-EPR-PID-570;1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-28-EPR-PID-590;1820-SA3-28-EPR-PID-591;1820-SA3-29-EPR-PID-595;1820-SA3-29-EPR-PID-596;1820-SA3-29-EPR-PID-597;1820-SA3-29-EPR-PID-598;1820-SA3-52-EPR-PID-640;1820-SA3-52-	11. Relief	11.1. external fire around the vessel	11.1.1.1. vent line to LP Flare header	11.1.1.1. check venting capacity for this line in the case of external fire and if vent is not of sufficient size, increase the size suitably	PIL	116	Process	R	Study/Review	The flow rate generated in case of the external fire is less than the controlling case (gas blow by from the export compressor inter stage K.O drum), hence 6" line vent is adequate.	-
270	28	PHASE I: Produced water system	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-25-EPR-PID-550;1820-SA3-44-EPR-PID-615;1820-SA3-52-EPR-PID-640;725;727;750	1. More Flow	1.1. higher water production from slug catcher	1.1.1.1. 44 LICAH 308	1.1.1.1. Ref # 36			Process	R			-
271	28	PHASE I: Produced water system	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-25-EPR-PID-550;1820-SA3-44-EPR-PID-615;1820-SA3-52-EPR-PID-640;725;727;750	2. Less Flow	2.2. discharge line/ flow meter blockages	2.2.1.1. 44 LICAH 308	2.2.1.1. review selection of the instrument for totalizing water amount produced in the plant	PIL	117	Process / Inst	R	Study/Review	Turbine flow meter with totaliser in DCS is provided (refer P&ID-615 Revision-1).	
272	28	PHASE I: Produced water system	1820-SA3-20-EPR-PID-511;1820-SA3-20-EPR-PID-525;1820-SA3-20-EPR-PID-527;1820-SA3-25-EPR-PID-550;1820-SA3-44-EPR-PID-615;1820-SA3-52-EPR-PID-640;725;727;750	2. Less Flow	2.2. discharge line/ flow meter blockages	2.2.1.1. 44 LICAH 308	2.2.1.2. relocate the flow meter inside the control valve isolation valves spool	PIL	118	Process	R	PID representation	Agreed. It is reflected in the PID Rev.0.	PID 615, G5
273	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	1. No Flow	1.1. no raw water supply	1.1.1.1. 45 LZALL 302; 1.1.1.2. existing fire water network SGT 1 & 2 jump over to SGT 3 & 4 with limited capacity; 1.1.1.3. fire tenders	1.1.1.1. operating and maintenance manual to state that jump over line supplying from SGT 1 & 2 cannot be used for full fire water protection at areas SGT 3 & 4	PIL/ KPC	119	HSE	R	Procedure	Agreed. It will be covered in the O& M Manual .	operating manual
274	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	1. No Flow	1.2. foam system blockages (strainer blockages)	1.2.1.1. none	1.2.1.1. foam skid vendor to supply standard FMEA for deluge foam skid system	PIL	120	HSE	R	Study/Review	It will be provided by fire fighting vendor.	-
275	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	1. No Flow	1.3. no water supply to pumps of the deluge foam skid	1.3.1.1. none	1.3.1.1. Ref # 115			Process / Piping	R			-
276	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	3. Lower Temperature	3.1. low ambient temperature	3.1.1.1. none	3.1.1.1. review requirements for heat tracing of the diesel supply and return lines with vendor and provide accordingly if required	PIL	121	HSE	R	Study/Review	Vendor does not recommend Heat traced Inlet and Outlet.The Package per NFPA-20 should be in temperatures down to -3° C. Operating the package at lower temperatures usually does not cause any problem, there is no need for Electrical heat tracing on the inlet and outlet down to -3° C,and it is warranted by engine manufacturer.	-
277	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	4. Lower Level	4.1. insufficient level of diesel in the diesel tank SA-T-4532 A/B to run for six hours	4.1.1.1. 45 LAL 301 (fire pump control panel); 4.1.1.2. 45 XA 303/306 (common alarm); 4.1.1.3. stand by DFW pump	4.1.1.1. advise level setting of the LAL in regards to the tank available volume	PIL	122	HSE	R	Study/Review	Level setting of the LAL in regards to the tank available volume is fixed. Refer to P&ID-Fire Water Tanks & Pumps, Doc. No. 1820-AS3-45-EHS-PID-001.	-
278	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	4. Lower Level	4.1. insufficient level of diesel in the diesel tank SA-T-4532 A/B to run for six hours	4.1.1.1. 45 LAL 301 (fire pump control panel); 4.1.1.2. 45 XA 303/306 (common alarm); 4.1.1.3. stand by DFW pump	4.1.1.2. DFW pump vendor to supply standard FMEA for diesel engine system	PIL	123	HSE	R	Study/Review	In case of failure of main DFW pump,Standby DFW pump will start.	-
279	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	5. Sampling	5.1. prolonged stagnant condition of fire water in the fire water tank SA-T-4531	5.1.1.1. biocide injection in upstream raw water supply	5.1.1.1. provide SC at the tank bottom (0.5 m level)	PIL	124	HSE	R	Hardware	Sampling connection is provided. Refer to P&ID-Fire Water Tanks & Pumps, Doc. No. 1820-AS3-45-EHS-PID-001.	-
280	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	6. Corrosion	6.1. stagnating conditions of water in the pipe work/ hydrants/ monitors	6.1.1.1. regular testing of the fire water system (weekly)	6.1.1.1. check material of construction for hydrants/ monitor components	PIL	125	HSE	R	Study/Review	Material of construction for hydrants/ monitor components as approved specifications.	-
281	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	7. Maintenance	7.1. maintaining 45 PCV 300	7.1.1.1. none	7.1.1.1. provide isolation valve down stream 45 PCV 300/ 45 FI 300	PIL	126	HSE	R	Hardware	Isolation valve down stream 45 PCV 300/ 45 FI 300 is provided. Refer to P&ID-Fire Water Tanks & Pumps, Doc. No. 1820-AS3-45-EHS-PID-001.	-
282	29	PHASE I: Fire water system	1820-SA3-45-EHS-PID-001;1820-SA3-45-EHS-PID-002;1820-SA3-45-EHS-PID-003	8. Service Failure	8.2. failure of the detection tubing for condensate tanks (poly flo tube) due to exposure to UV radiation	8.2.1.1. none	8.2.1.1. consider replacing poly flo tube with linear heat sensing cable (LHSD)	PIL	127	HSE	R	Hardware	Poly flo tube was replaced with (LHSD),Refer to P&ID - Firefighting Foam System, Doc. No. 1820-SA3-45-EHS-PID-003.	-
283	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	1. Less Flow	1.1. piping blockages	1.1.1.1. RO treated water/ chemical injection in SA-V-6031; 1.1.1.2. closed circuit	1.1.1.1. provide low flow alarm of 60 FIC 300	PIL	128	Process	R	Alarm/DCS	Agreed. It is reflected in The PID Rev.0 .	PID 665, C7

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
284	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	1. Less Flow	1.2. partial opening of manual valves	1.2.1.1. closed circuit	1.2.1.1. Ref # 122			HSE	R			PID 665, C7
285	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	2. No Flow	2.1. failure of 60 FIC 300 causing the valve 60 FCV 300 to close during start up with no other users online	2.1.1.1. start up bypass around hot water users; 2.1.1.2. DCS diagnostics	2.1.1.1. provide procedures in the operating manual to assure all process heaters bypasses are open during start up conditions	PIL/ KPC	129	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
286	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	2. No Flow	2.2. inadvertant closure of manual valves	2.2.1.1. lock open valves in the pump discharge lines; 2.2.1.2. 60 PZALL 303 A/B (pump suction lines)	2.2.1.1. Ref # 122			HSE	R			-
287	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	5. Higher Temperature	5.1. failure of 60 TIC 302 causing 60 TCV 302 to fully open (during hot weather conditions)	5.1.1.1. 60 TZAHH 304; 5.1.1.2. 60 PICAH 300	5.1.1.1. check design of the SA-V-6031 for requirements of over pressure protection based on pressure build up by overheating case	PIL	130	Process	R	Study/Review	The design pressure of hot water expansion vessel SA-V-6031 is revised to 11.5 barg.	-
288	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	5. Higher Temperature	5.1. failure of 60 TIC 302 causing 60 TCV 302 to fully open (during hot weather conditions)	5.1.1.1. 60 TZAHH 304; 5.1.1.2. 60 PICAH 300	5.1.1.2. provide high temperature alarm of 60 TI 300	PIL	131	Process	R	Alarm/DCS	Agreed. It is reflected in The PID Rev.0 .	PID 666, D1
289	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	6. Higher Level	6.1. inadvertant opening of the make up water manual valve	6.1.2.1. 60 PIAH 300; 6.1.2.2. 60 RV 300 A/B; 6.1.2.3. 60 PCV 300 B	6.1.2.1. ensure SA-V-6031 vent line is discharged to location out side normal access routes/ elevated due to N2 hazard	PIL	132	Piping	R	Others	It is located on top platform at safe height.	-
290	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	8. Contamination	8.1. process area heaters tube rupture and gas/condensate break through to hot water system	8.1.2.1. 60 PICAH 300	8.1.2.1. check capacity of 60 RV 300 A/B to relieve the worst credible process heater tube rupture scenario. If not adequate, provide additional over pressure protection (check flare connection application)	PIL	133	Process	R	Study/Review	The design pressure of hot water expansion vessel SA-V-6031 and PV-300 A/B set pressures are revised to 11.5 barg the same as process heaters shells then the recommendation is no more applicable.	-
291	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	8. Contamination	8.1. process area heaters tube rupture and gas/condensate break through to hot water system	8.1.3.1. none	8.1.3.1. provide gas detection part of plant F&G system in the proximity of vent point	PIL	134	HSE	R	Hardware	Gas detection in the proximity of vent point is not required .This is rare upset condition, anyway if this happen, the gas will release from hot water vessel vent point for short period of time to safe location (no source of ignition) then the relief valve at the exchanger shall open and relief the gas leak to flare, however UV/IR flame detectors are provided to monitor the area and detect any accidental ignition of gas release.	-
292	31	PHASE I: Hot water system	1820-SA3-20-EPR-PID-512;1820-SA3-20-EPR-PID-513;1820-SA3-20-EPR-PID-516;1820-SA3-20-EPR-PID-517;1820-SA3-20-EPR-PID-518;1820-SA3-20-EPR-PID-519;1820-SA3-60-EPR-PID-664;1820-SA3-60-EPR-PID-665;1820-SA3-60-EPR-PID-666	9. Sampling	9.1. hot water sampling point is not available	9.1.1.1. none	9.1.1.1. provide sample connection on pump suction header adjacant to CIP 60006	PIL	135	Process	R	Hardware	Agreed. It is reflected in The PID Rev.0 .	PID 665, F2
293	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	1. More Flow	1.2. failure of the controller 48 PICA 300 causing valve 48 PCV 300 to fully open (during start up)	1.2.1.1. DCS diagnostics; 1.2.1.2. 48 PIAH 302; 1.2.1.3. 48 PZAHH 304; 1.2.1.4. 48 RV 300 A/B	1.2.1.1. confirm an executive action 48 PZAHH 304 part of plant ESD to isolate fuel gas supply from export gas pipe line. Check P&IDs / Cause and Effect Diagrams	PIL	136	Process	R	Alarm/DCS	29-ESV-3314 (PID-401 Rev. 0) is provided to isolate the HP fuel gas for SGT3 & 4 from the export pipeline and the Cause and Effect will be updated accordingly.	-
294	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	2. Less Flow	2.1. partial opening of the manual isolation valves in supply lines either from permeate compressor or from T.EX.	2.1.1.1. GTG control system	2.1.1.1. address low flow conditions during GTG vendor HAZOP	PIL	137	Process/HSE	R	Others	HAZOP recommendation was reviewed during GTG HAZOP. The safeguards available in the GTG package are found to be adequate to handle the low flow conditions.	-
295	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	2. Less Flow	2.3. mesh pad (SA-V-4831) / mesh pad/ coalescing filters SA-S-8031 (A/B/C) / HP Fuel gas filters SA-S-4831 (A/B) / normal fuel gas filter SA-S-8032 A/B blockages	2.3.1.1. 48 PIA 302 and 48 PI 305 (SA-V-4831); 2.3.1.2. 48 PDIAH 306/307 (SA-S-4831); 2.3.1.3. 80 PDIAH 300 (SA-S-8032); 2.3.1.4. 80 PDI 300 A/B/C (SA-S-8031 A/B/C)	2.3.1.1. operator's manual to include trouble shooting of the demister pad blockage by checking reading of 28 PT-314/ 28 PICA-301	PIL/ KPC	138	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
296	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	3. No Flow	3.2. failure of the control loop hardware of 28 PICA 325 causing fail safe close action of 28 PCV 325	3.2.1.1. automatic switching to high BTU fuel from T.EX.; 3.2.1.2. alternative HP Fuel gas supply from SGT4	3.2.1.1. provide valve positioner transmitter for 28 PCV 325 and provide discrepency alarm	PIL	139	Process / Inst	R	Hardware	Valve positioner already provided and discrepancy alarm will be provided in next issue of PID.	PID 591
297	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	4. Reverse Flow	4.1. stopping permeate compressors on SGT4	4.1.1.1. non return valve	4.1.1.1. close 80 ESV 300 or 301 when corresponding permeate compressor is shut down (OSD action)	PIL	140	Process	R	Alarm/DCS	Agreed. It is incorporated in the Cause and Effect Diagram.	Cause and Effect
298	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	6. Lower Pressure	6.1. accidential damage to pipes/valves/equipment	6.1.1.1. F &G system; 6.1.1.2. ESD system; 6.1.1.3. 48 PIAL 302; 6.1.1.4. 48 PICAL 300; 6.1.1.5. 28 PICAL 325	6.1.1.1. Ref # 9			HSE	R			-
299	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	7. Higher Temperature	7.1. failure of the controller 48 TDICA 301 causing heater to stay on line	7.1.1.1. DCS Diagnostics; 7.1.1.2. 48 TZAHH 302/303; 7.1.1.3. built in equipment overheat protection	7.1.1.1. confirm 48 TZAHH 303 trips the heater directly through heater thyristor control panel	PIL	141	Process / Electrical	R	Alarm/DCS	Agreed. It is incorporated in the Cause and Effect Diagram.	Cause and Effect
300	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	7. Higher Temperature	7.1. failure of the controller 48 TDICA 301 causing heater to stay on line	7.1.1.1. DCS Diagnostics; 7.1.1.2. 48 TZAHH 302/303; 7.1.1.3. built in equipment overheat protection	7.1.1.2. relocate 48 TZAHH 303 between heater outlet and isolation valve	PIL	142	Process	R	PID representation	Agreed. It is reflected in the PID Rev.0.	PID 630, C5
301	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	9. Higher Level	9.4. SA-S-8031 not regularly drained (manual operation)	9.4.2.1. none	9.4.2.1. change duty of 80 LIAH 300 to LZAHH and provide this input to trip respective GTG and provide level indication in DCS	PIL	143	Process / Inst	R	Alarm/DCS	Agreed. It is reflected in the PID Rev.0 and The cause & Effect already updated accordingly.	PID 680, G4
302	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	10. Lower Level	10.1. failure of 48 LICA 300 causing valve 48 LCV 300 to fully open (during black start up conditions)	10.1.2.1. none	10.1.2.1. Ref # 2			Process	R			PID 612, A5
303	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	11. Relief	11.1. relief action of 80 RV 301 A/B or 80 RV 300 A/B/C	11.1.1.1. none	11.1.1.1. carry out dispersion modeling to check impact of hot gas exhaust and position the vents accordingly to eliminate the hazard	PIL	144	HSE	R	Study/Review	Dispersion modeling has been done, based on the results of the consequence modeling: the extent of the gas cloud in case of full load reliefing will not reach the GTG's exhuast gases (find attached-1 for gas cloud foot print),moreover the vent point located down wind to GTG's stack.	The attachment to be provided.
304	32	PHASE I: HP Fuel gas	1820-SA3-20-EPR-PID-515;1820-SA3-28-EPR-PID-591;599;1820-SA3-48-EPR-PID-630;1820-SA3-48-EPR-PID-631;632;1820-SA3-80-EPR-PID-680/1	11. Relief	11.1. relief action of 80 RV 301 A/B or 80 RV 300 A/B/C	11.1.2.1. none	11.1.2.1. Ref 9			HSE	R			-
305	33	PHASE I: LP Fuel gas	1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-40-EPR-PID-605;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-613;1820-SA3-48-EPR-PID-631;1820-SA3-52-EPR-PID-643;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2	1. More Flow	1.1. failure of the controller of 48 PICA 308 causing both valves 48 PCV 308 A/B to fully open	1.1.1.1. DCS diagnostics; 1.1.1.2. 48 RV 304 A/B	1.1.1.1. check LP Fuel gas users have available over pressure alarm / protection (if required)	PIL	145	Process	R	Study/Review	All the packages receiving LP fuel gas have overpressure alarm / protection except Glycol package which has only protection by means of 27 PCV 3351 and no alarm. We feel no high pressure alarm is required for this user as there is no restriction downstream of the PCV.	-

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
306	33	PHASE I: LP Fuel gas	1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-40-EPR-PID-605;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-613;1820-SA3-48-EPR-PID-631;1820-SA3-52-EPR-PID-643;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2	4. Reverse Flow	4.1. stopping permeate compressors on SGT3	4.1.1.1. non return valves	4.1.1.1. close 48 ESV 303 when permeate compressor is shut down (OSD action)	PIL	146	Process / Inst	R	Alarm/DCS	The Cause and Effect Diagram has been updated accordingly.	Cause and Effect
307	33	PHASE I: LP Fuel gas	1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-40-EPR-PID-605;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-613;1820-SA3-48-EPR-PID-631;1820-SA3-52-EPR-PID-643;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2	4. Reverse Flow	4.2. stopping SGT3 and reversing LP Fuel gas via LP Fuel gas connection to hot oil heaters	4.2.1.1. refer to 4.1.1.1	4.2.1.1. relocate connection point between two trains upstream at common LP Fuel supply to hot oil heaters (on line 6"-FG48734-AA3) and provide ESV for both trains. Update ESD logic accordingly	PIL	147	Process	R	Hardware	Agreed. The PID and the Cause and Effect are updated accordingly.	PID 631, D7 PID 631, E7
308	33	PHASE I: LP Fuel gas	1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-40-EPR-PID-605;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-613;1820-SA3-48-EPR-PID-631;1820-SA3-52-EPR-PID-643;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2	6. Lower Pressure	6.1. accidential damage to pipes/valves/equipment	6.1.1.1. F &G system; 6.1.1.2. ESD system; 6.1.1.3. 48 PICAL 308	6.1.1.1. Ref # 9			HSE	R			-
309	33	PHASE I: LP Fuel gas	1820-SA3-26-EPR-PID-564;1820-SA3-27-EPR-PID-582;1820-SA3-40-EPR-PID-605;1820-SA3-41-EPR-PID-610;1820-SA3-41-EPR-PID-611;1820-SA3-41-EPR-PID-613;1820-SA3-48-EPR-PID-631;1820-SA3-52-EPR-PID-643;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2	8. Lower Level	8.1. failure of 48 LICA 304 causing valve 48 LCV 304 to fully open	8.1.2.1. none	8.1.2.1. Ref # 2			Process	R			PID 612, A5
310	34	PHASE I: Raw/fresh/potable water	1820-SA3-20-EPR-PID-527;1820-SA3-50-EPR-PID-635/1;1820-SA3-50-EPR-PID-635/2;1820-SA3-50-EPR-PID-636;1820-SA3-60-EPR-PID-664;727	1. Less Flow	1.1. partially open manual valves (for SA-P-5033 A/B)	1.1.1.1. none	1.1.1.1. check control/ monitoring features of RO unit to alarm/ shut down in the case of low performance conditions (applicable also to low pressure conditions)	PIL	148	Process	R	Study/Review	Conductivity & ORP alarms are provided.	607011-01-001, Rev. B
311	34	PHASE I: Raw/fresh/potable water	1820-SA3-20-EPR-PID-527;1820-SA3-50-EPR-PID-635/1;1820-SA3-50-EPR-PID-635/2;1820-SA3-50-EPR-PID-636;1820-SA3-60-EPR-PID-664;727	2. No Flow	2.2. hardware failure of 50 ESV 300 causing valve to go to fail close mode	2.2.1.1. 50 LZALL 304; 2.2.1.2. 50 LICAL 303; 2.2.1.3. inventory of raw water storage tank that will last for 16 hours	2.2.1.1. modify the designation of 50 ESV 300 to reflect duty of the valve	PIL	149	Process	R	PID representation	Agreed. It is reflected in the PID Rev.0.	PID 635, C3
312	34	PHASE I: Raw/fresh/potable water	1820-SA3-20-EPR-PID-527;1820-SA3-50-EPR-PID-635/1;1820-SA3-50-EPR-PID-635/2;1820-SA3-50-EPR-PID-636;1820-SA3-60-EPR-PID-664;727	2. No Flow	2.3. maintenance / failure of RO unit	2.3.1.1. inventory of fresh water storage tank that will last for 16 hours	2.3.1.1. provide connection to fresh water tank from potable water distribution network (normally close valves)	PIL	150	Process	R	Hardware	Agreed. It is reflected in the PID Rev.0.	PID 635 2/2, E8
313	34	PHASE I: Raw/fresh/potable water	1820-SA3-20-EPR-PID-527;1820-SA3-50-EPR-PID-635/1;1820-SA3-50-EPR-PID-635/2;1820-SA3-50-EPR-PID-636;1820-SA3-60-EPR-PID-664;727	2. No Flow	2.7. no potable water available from train 1 & 2	2.7.1.1. none	2.7.1.1. provide pressure transmitter/ alarm on the common tapping line taken for SGT 3 & 4	PIL	151	Process	R	Hardware	Agreed. It is reflected in the PID Rev.0.	PID 636, E5
314	34	PHASE I: Raw/fresh/potable water	1820-SA3-20-EPR-PID-527;1820-SA3-50-EPR-PID-635/1;1820-SA3-50-EPR-PID-635/2;1820-SA3-50-EPR-PID-636;1820-SA3-60-EPR-PID-664;727	2. No Flow	2.8. manual isolation at the safet shower	2.8.1.1. none	2.8.1.1. Ref # 151			Process	R			PID 636, E5
315	34	PHASE I: Raw/fresh/potable water	1820-SA3-20-EPR-PID-527;1820-SA3-50-EPR-PID-635/1;1820-SA3-50-EPR-PID-635/2;1820-SA3-50-EPR-PID-636;1820-SA3-60-EPR-PID-664;727	3. Higher Temperature	3.1. stagnation in the potable water network	3.1.1.1. tie in point and the main header where continous flow is present; 3.1.1.2. potable water header shaded by other piping on the pipe rack	3.1.1.1. check if it is possible to heat up safety shower/ eye washer riser to un acceptable high temperature (consult applicable standard for temperature). Provide over heating protection if required	PIL	152	HSE	R	Study/Review	The bleed pipe will be provided in the safety shower eye wash unit to avoid overheating by solar radiation.	-
316	34	PHASE I: Raw/fresh/potable water	1820-SA3-20-EPR-PID-527;1820-SA3-50-EPR-PID-635/1;1820-SA3-50-EPR-PID-635/2;1820-SA3-50-EPR-PID-636;1820-SA3-60-EPR-PID-664;727	4. Lower Level	4.2. low/ no fresh water supply from fresh water maker unit (SA-A-5031) to water storage tank (SA-T-5031)	4.2.1.1. 50 LZALL 301	4.2.1.1. provide high/low alarm off 50 LICA 300	PIL	153	Process	R	Alarm/DCS	Agreed. It is reflected in the PID Rev.0.	PID 635 2/2, D7
317	34	PHASE I: Raw/fresh/potable water	1820-SA3-20-EPR-PID-527;1820-SA3-50-EPR-PID-635/1;1820-SA3-50-EPR-PID-635/2;1820-SA3-50-EPR-PID-636;1820-SA3-60-EPR-PID-664;727	5. Corrosion	5.1. high chloride content of fresh water maker unit reject stream	5.1.1.1. none	5.1.1.1. review use of plastic piping (GRE) for reject stream to drain it directly to open drain pit	PIL	154	Process	R	Hardware	Agreed. It is reflected in the PID Rev.0.	PID 635 2/2, D2
318	36	PHASE I: Compressed air	1820-SA3-53-EPR-PID-650/1;1820-SA3-53-EPR-PID-650/2;1820-SA3-53-EPR-PID-651;1820-SA3-53-EPR-PID-652	5. Instrumentation	5.1. common IA discharge header flow and humidity measurement instrumentation shown as local on the P&ID	5.1.1.1. none	5.1.1.1. review if the signal is required in the DCS (for 53 FI 300A)	PIL	155	Process	R	Study/Review	Agreed. It is reflected in the PID Rev.0.	The tag number changed to 3300 instead of 3300A . PID 651
319	36	PHASE I: Compressed air	1820-SA3-53-EPR-PID-650/1;1820-SA3-53-EPR-PID-650/2;1820-SA3-53-EPR-PID-651;1820-SA3-53-EPR-PID-652	5. Instrumentation	5.1. common IA discharge header flow and humidity measurement instrumentation shown as local on the P&ID	5.1.1.1. none	5.1.1.2. review need for humidity meter 53 AI 300A	PIL	156	Process	R	Study/Review	Dew point Analysers are provided downstreams of each dryer then it is not required.	-
320	36	PHASE I: Compressed air	1820-SA3-53-EPR-PID-650/1;1820-SA3-53-EPR-PID-650/2;1820-SA3-53-EPR-PID-651;1820-SA3-53-EPR-PID-652	6. Maintenance	6.1. maintenance of one IA dryer package while others are online	6.1.1.1. none	6.1.1.1. finalize P&ID by providing from vendors information and ensure individual manual isolation at inlet/ outlet is available	PIL	157	Process	R	Study/Review	The IA dryers isolations is provided and it is reflected in the PID Rev.0.	JI-187030011-A5331-C03-001-A
321	36	PHASE I: Compressed air	1820-SA3-53-EPR-PID-650/1;1820-SA3-53-EPR-PID-650/2;1820-SA3-53-EPR-PID-651;1820-SA3-53-EPR-PID-652	7. Service Failure	7.1. limited vendor information available in this stage about compressors / IA dryer packages	7.1.1.1. standard supply similar to existing plant packages	7.1.1.1. air compressor vendor to supply standard FMEA for compressor package components	PIL	158	Rotating	R	Others	FMEA does not required for Compressore as Compressors and dryers are manufactured to Atlas Copco standard procedures and the design is based on their many years experience with in the compressed air field. Please refer attachment-2 for vendor confirmation.	Attachment-2
322	38	PHASE II: Power generation (fuel gas & combustion air schemes)	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149456;3A111-149459-Sht. 4 of 4	1. More Flow	1.3. failure of V2P-941/941-1 to open fully	1.3.1.1. flow limited by FO-941-3/941-4	1.3.1.1. advise venting flow conditions under full load of the machine. perform dispersion modelling for this case	PIL	233	Rotating (vendor) / HSE	R	Study/Review	There is no need to do dispersion modelling for this case,because lube oil mist vapor is heavier than air and on venting it will disperse towards down, moreover lube oil mist vent is provided with flame arrestor to stop any fire to reach the interior lube oil system.	-
323	38	PHASE II: Power generation (fuel gas & combustion air schemes)	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149456;3A111-149459-Sht. 4 of 4	1. More Flow	1.3. failure of V2P-941/941-1 to open fully	1.3.2.1. none	1.3.2.1. refer to 1.3.1.1 Ref. 233			Rotating (vendor) / HSE	R			-
324	38	PHASE II: Power generation (fuel gas & combustion air schemes)	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149456;3A111-149459-Sht. 4 of 4	1. More Flow	1.5. failure of PCV-941-2 to fully close during operation	1.5.1.1. none	1.5.1.1. review pipe run from exhaust collector to open drain system and accordingly provide PP insulation	PIL	234	Rotating (vendor)/ Process / Piping	R	Study/Review	Vendor (Solar) has confirmed that PP insulation is provided. It will be updated in next issue of PID.	PID 680, 1/2 & 2/2
325	38	PHASE II: Power generation (fuel gas & combustion air schemes)	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149456;3A111-149459-Sht. 4 of 4	5. Lower Pressure	5.1. accidential damage to pipes/valves/equipment	5.1.1.1. F &G system for GTG; 5.1.1.2. ESD system for GTG	5.1.1.1. Ref # 9			HSE	R			-
326 B	38	PHASE II: Power generation (fuel gas & combustion air schemes)	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149456;3A111-149459-Sht. 4 of 4	5. Lower Pressure	5.2. instrument air low supply of pressure - below 100psig	5.2.1.1. none	5.2.1.1. review availability of minimum supply at 100 psig	PIL/ KPC	235	Rotating (vendor)	R	Study/Review	SGT3&4 GTGs are similar to the existing units(SGT1&2). Operating conditions of IA is same for new trains also. So,PIL feels there is no issue on this.	
327	38	PHASE II: Power generation (fuel gas & combustion air schemes)	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149456;3A111-149459-Sht. 4 of 4	7. Maintenance	7.1. access to air intake equipment/ instrumentation	7.1.1.1. none	7.1.1.1. review access requirements and provide platform accordingly	PIL	236	Rotating (vendor)/ Piping / Instrument	R	Study/Review	Mobile access platform will be provided for the air intake instruments.	
328	38	PHASE II: Power generation (fuel gas & combustion air schemes)	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149456;3A111-149459-Sht. 4 of 4	8. Safety	8.1. venting of fuel gas lines during start-up	8.1.2.1. none	8.1.2.1. Ref 1.3.1.1 Ref. 233			Rotating (vendor) / HSE	R			-
329	38	PHASE II: Power generation (fuel gas & combustion air schemes)	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149456;3A111-149459-Sht. 4 of 4	9. Service Failure	9.1. loss of low or high BTU fuels on both trains	9.1.1.1. none	9.1.1.1. review requirements for auto switch over between low and high BTU fuels for both trains as per existing plant philosophy	PIL	237	Rotating (vendor)	R	Study/Review	Auto Switchover is provided.	B804021 PID 659 1/2, 2/2
330 B	38	PHASE II: Power generation (fuel gas & combustion air schemes)	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149456;3A111-149459-Sht. 4 of 4	9. Service Failure	9.1. loss of low or high BTU fuels on both trains	9.1.1.1. none	9.1.1.2. review capacity of individual trains on the fuel gas skid to handle full load of low BTU fuel	PIL	238	Rotating (vendor)	C	Study/Review	Please refer attached document "fuel system description" (Attachment-2). This document is already approved by KPC vider KPC transmittal KPC-PIL-187-3863-TX.	Attachment-2
331	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	1. No Fuel Gas Flow	1.5. Blocked strainer	1.5.1.1. refer to 1.2.1.1	1.5.1.1. review need for pressure gauge upstream of the strainers	PIL	239	Static (Vendor)	R	Study/Review	Pressure Gauge upstream of the strainers provided. Refer Rev.1 P&ID.	B-8040-21
332	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	2. No Air Flow	2.2. Malfunction of VFD	2.2.1.1. refer to 1.2.1.1	2.2.1.1. Confirm existance of an alarm to indicate malfunction of VFD	PIL	240	Static (Vendor)	R	Alarm / DCS / RCP	VFD Fault (58-XA-3360) is shown in Vendor P &ID doc. No. 187030008-A5831-C03-001_Rev. H. VFD fault will be displayed in DCS.	Vendor P &ID doc. No. 187030008-A5831-C03-001 Rev. H.

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
333	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	3. Less Fuel Gas Flow	3.3. failure of hardware of XV-3354 causing valve not to close when demanded	3.3.1.1. Note-9 specifices that vent is to be located at a safe location; 3.3.1.2. ZSC-3354 (indicating not closed) will shutdown the heater	3.3.1.1. review hazardous area classification for area of the vent discharge	PIL	241	HSE	R	Study/Review	Considered, Refer note no. 9 (all vents will be treated as zone 1) in Hazardous Area Classification Layout,Doc. No.1820-SA3-74-EHS-HAC-001,Rev 0.	B-8040-21
334	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	3. Less Fuel Gas Flow	3.6. Partial blockage of strainer	3.6.1.1. refer to 1.2.1.1	3.6.1.1. refer to 1.5.1.1 Ref. 239			Static (Vendor)	R			-
335	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	3. Less Fuel Gas Flow	3.7. failure of controller TIC-3355 causing valve PV-3350 to stay at last position low / closed	3.7.1.1. DCS diagnostics; 3.7.1.2. refer to 1.2.1.1	3.7.1.1. Configure DCS to maintain firing at last position of PV-3350	PIL	242	Static (Vendor) / Instrument	R	Alarm / DCS	Note for maintaining firing at last position of PV-3350 is included in Vendor P &ID doc. No. 187030008-A5831-C03-001_Rev. H and configuration for the same will be done in DCS.	Vendor P &ID doc. No. 187030008-A5831-C03-001_Rev. H
336	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	3. Less Fuel Gas Flow	3.8. failure of controller FIC-3352 causing valve PV3350 to stay at last position low/ closed	3.8.1.1. DCS will give alarm in case of transmitter malfunction; 3.8.1.2. refer to 1.2.1.1	3.8.1.1. Configure DCS to maintain air flow at last position in case of failure of FT-3352	PIL	243	Static (Vendor) / Instrument	R	Alarm / DCS	Note for configure DCS to maintain air flow at last position in case of failure of FT-3352 is included in Vendor P &ID doc. No. 187030008-A5831-C03-001_Rev. H and configuration for the same will be done in DCS.	Vendor P &ID doc. No. 187030008-A5831-C03-001_Rev. H
337	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	4. Less Air Flow	4.1. failure of controller PIC-3357 causing PV 3357 to stay at last low position	4.1.1.1. DCS Diagnostics; 4.1.1.2. refer to 1.2.1.1	4.1.1.1. consider configuring DCS to maintain draft at last position in case of failure of PIC 3357	PIL	244	Static (Vendor) / Instrument	R	Alarm / DCS	Note to configure DCS to maintain draft at last position in case of failure of PIC 3357 is included in Vendor P &ID doc. No. 187030008-A5831-C03-001_Rev. H and configuration for the same will be done in DCS.	Vendor P &ID doc. No. 187030008-A5831-C03-001_Rev. H
338	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	4. Less Air Flow	4.2. Failure of VFD	4.2.1.1. FALL-3351; 4.2.1.2. refer to 1.2.1.1	4.2.1.1. Provide a FAL on FIC-3352	PIL	245	Static (Vendor) / Process / Instrument	R	Alarm / DCS	Low alarm on FIC-3352 is provided. Refer vendor's P&ID B-8040-21 Rev.0.	B-8040-21
339	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	4. Less Air Flow	4.3. Partial blockage of inlet air filter	4.3.1.1. FALL-3351; 4.3.1.2. refer to 1.2.1.1	4.3.1.1. Refer to 4.2.1.1 Ref. 245			Static (Vendor) / Process / Instrument	R		Confirmed. Refer vendor's P&ID.	B-8040-21
340	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	5. More Fuel Gas Flow	5.3. PCV-3350 bypass inadvertently opened	5.3.2.1. PAHH-3351; 5.3.2.2. TI-3351; 5.3.2.3. TAHH-3352	5.3.2.1. Provide a TAH on TI-3351	PIL	246	Static (Vendor) / Process / Instrument	R	Alarm / DCS	TAH on TI-3351 provided. Refer vendor's Rev.0 P&ID.	B-8040-21
341	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	6. More Air Flow	6.2. failure of controller FIC-3352 causing PV 3350 to stay at last high/ open postion	6.2.1.1. DCS Diagnostics; 6.2.1.2. PAH-3357; 6.2.1.3. PAHH-3355	6.2.1.1. Configure DCS to maintain air flow at last position of PV 3350	PIL	247	Static (Vendor) / Instrument	R	Alarm / DCS	Note to configure DCS to maintain air flow at last position of PV-3350 is included in Vendor P &ID doc. No. 187030008-A5831-C03-001_Rev. H and configuration for the same will be done in DCS.	Vendor P &ID doc. No. 187030008-A5831-C03-001_Rev. H
342	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	14. Higher Tube Temperature	14.1. Flame impingment	14.1.1.1. TAHH-3354A/B/C; 14.1.1.2. PAH-3350; 14.1.1.3. PAHH-3351	14.1.1.1. Add TAH on TI-3350	PIL	248	Static (Vendor) / Process / Instrument	R	Alarm / DCS	TAH on TI-3350 provided. Refer vendor's Rev.0 P&ID.	B-8040-21
343	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	15. Change in Fuel Composition	15.1. Loss of lean gas and switch over to rich gas	15.1.1.1. AIAH-3350	15.1.1.1. Review use of CO analyser input in DCS to switchover between high and low BTU fuels (include part of DCS calculation for fuel-air ratio)	PIL	249	Static (Vendor) / Process / Instrument	R	Study/Review	CO analyzer shall not be connected on-line to control air-fuel ratio. Operator to monitor CO reading and manually switch over from low BTU gas to high BTU gas and vice-versa based on the CO analyzer reading.	B-8040-21
344	40	PHASE II: Hot Oil Heater - LP Fuel Gas to Burners and Combustion Chamber	B-8040-21	16. Part Of General	16.1. Blower operation in manual mode	16.1.1.1. none	16.1.1.1. Clarify operation of blower in handmode (manual operation) and provide operating procedure accordingly. Represent proper blower motor controls on P&ID	PIL/ KPC	250	Static (Vendor) /Process	R	Procedure / PID representation	Already shown in vendor's Rev. 0 P&ID. IOM will include the manual operation procedures for blower	B-8040-21
345	41	PHASE II: Hot oil circulation system	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	3. Less Flow to consumer	3.1. failure of 58 PDIC 300 control hardware causing 58 PCV 300 to fail open	3.1.1.1. low temprature alarms on the consumer	3.1.1.1. provide alarm for 58 PDIC 300	PIL	251	Process	R	Alarm / DCS	Agreed. It is reflected in The PID Rev.0 .	PID 662, C5
346	41	PHASE II: Hot oil circulation system	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	7. Lower Pressure	7.1. failure of 58 PICA 303 B causing 58 PCV 303 A to close	7.1.1.1. operating and maintenance procedures	7.1.1.1. verify failure mode included in procedures	PIL/ KPC	252	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
347	41	PHASE II: Hot oil circulation system	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	8. Higher Level	8.1. make up valve left open	8.1.1.1. 58 LZAHH 303; 8.1.1.2. 58 LIAH 300	8.1.1.1. provide DCS interlock to stop SA-P-5832 on 58 LIAH 300	PIL	253	Process	R	PID representation	Agreed. 58-LIA 300HH is added to stop the pump and the PID Rev0 updated accordingly.	PID 662, D5
348	42	PHASE II: Hot Oil storage	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	1. More Flow	1.1. draining of individual equipment on hot oil service	1.1.1.1. SA-E-5831 design; 1.1.1.2. 58 TIAH 307	1.1.1.1. provide procedure part of operating manuals to include control draining of hot oil system in order not to exceed normal operating temperature of the tank at 60 degrees C	PIL/ KPC	254	Process	R	Procedure	Agreed, It will be included in the operating manual.	operating manual
349	42	PHASE II: Hot Oil storage	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	1. More Flow	1.1. draining of individual equipment on hot oil service	1.1.2.1. 58 PCV 317B; 1.1.2.2. 58 PVRV 301 A/B; 1.1.2.3. 58 PICAH 317	1.1.2.1. verify 58 PVRV 301 A/B sizing for N2 breakthrough during system draining	PIL	255	Process / Instrument	R	Study/Review	58-PVRV-301A/B size revised for N2 break through flowrate.	-
350	42	PHASE II: Hot Oil storage	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	2. Less Flow	2.1. strainer blockages	2.1.1.1. operator attendance during make up operation	2.1.1.1. provide operating procedures part of operating manual to observe pump operation during make up of hot oil system	PIL/ KPC	256	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
351	42	PHASE II: Hot Oil storage	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	2. Less Flow	2.2. partially open isolation valve on the pump's suction/ discharge sides	2.2.1.1. refer to 2.1.1.1	2.2.1.1. refer to 2.1.1.1 Ref. 256			Process	R			operating manual
352	42	PHASE II: Hot Oil storage	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	3. No Flow	3.1. close isolation valve on the pump's suction/ discharge sides or expansion vessel isolation valve closed	3.1.1.1. operator attendance during make up operation; 3.1.1.2. the minimum pump flow line (dead heading of the pump)	3.1.1.1. refer to 2.1.1.1 Ref. 256			Process	R			operating manual
353	42	PHASE II: Hot Oil storage	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	4. Higher Pressure\	4.1. solar radiation effects on hot oil drain lines from individual equipment	4.1.1.1. current operating procedures for draining individual equipment	4.1.1.1. check thermal expansion in the hot oil drain lines from individual equipment during off line conditions and provide thermal relief if required	PIL	257	Process	R	Study/Review	As a normal practice all drain lines from each equipment to be totally drained out to hot oil tank prior to closing isolation valve using nitrogen. A note is already provided in the PID for this. This will also be included in the operating manual.	operating manual
354	42	PHASE II: Hot Oil storage	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	6. Higher Temperature	6.1. loss of SA-E-5831 fan	6.1.1.1. 58 TIAH 307; 6.1.1.2. 58 YL 303 A/B (for electrical faults); 6.1.1.3. 58 VAH 303 A/B	6.1.1.1. refer to 1.1.1.1 Ref. 254			Process	R			operating manual
355	42	PHASE II: Hot Oil storage	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	6. Higher Temperature	6.2. manual operation of SA-E-5831 fan (off line when required)	6.2.1.1. refer to 6.1.1.1 and 6.1.1.2	6.2.1.1. refer to 1.1.1.1 Ref. 254			Process	R			operating manual
356	42	PHASE II: Hot Oil storage	1820-SA3-21-EPR-PID-529;1820-SA3-58-EPR-PID-659/1;1820-SA3-58-EPR-PID-659/2;1820-SA3-58-EPR-PID-662/1;1820-SA3-58-EPR-PID-662/2;1820-SA3-58-EPR-PID-663	7. Maintenance	7.1. opening drain lines/ spectacle blinds on individual drain lines from hot oil users	7.1.1.1. none	7.1.1.1. review proper access to drain valves/ spectacle blinds to facilitate draining operation	PIL	258	Piping	R	Study/Review	Proper acces Provided. .	-
357	43	PHASE II: Permeate compressor (SA-K-2631) lube oil, jacket water and cylinder lube oil and instrument air	1G-15389;1G-15391;1G-15390;2G-16918	4. Higher Temperature	4.2. heater left on during summer conditions/failure of the thermostat (lube oil, cylinder oil and jacket water systems)	4.2.1.1. 26 TAH 3422; 4.2.1.2. 28 TAH 3403	4.2.1.1. heater controls to be shown on the P&ID (SA-K-2631/2641-E3/4/5)	PIL	259	Rotating (vendor) / Process	R	PID representation	Shown in the revised (Rev. D) P&ID received from MES.	PID 1G-15389, C8
358	43	PHASE II: Permeate compressor (SA-K-2631) lube oil, jacket water and cylinder lube oil and instrument air	1G-15389;1G-15391;1G-15390;2G-16918	4. Higher Temperature	4.2. heater left on during summer conditions/failure of the thermostat (lube oil, cylinder oil and jacket water systems)	4.2.1.1. 26 TAH 3422; 4.2.1.2. 28 TAH 3403	4.2.1.2. review need for temperature gauge in the common oil line from cylinder oil tank	PIL	260	Rotating (vendor) / Process	R	Study/Review	Shown in the revised (Rev. D) P&ID received from MES.	PID 1G-15890, F8
359	43	PHASE II: Permeate compressor (SA-K-2631) lube oil, jacket water and cylinder lube oil and instrument air	1G-15389;1G-15391;1G-15390;2G-16918	4. Higher Temperature	4.4. motor bearing damage	4.4.1.1. 26 TI 3404/3405	4.4.1.1. provide high temperature alarm from 26 TI 3404/3405	PIL	261	Rotating (vendor) / Process / Instrument	R	PID representation	Shown in the revised (Rev. D) P&ID received from MES.	PID 1G-15389, A3 and B3
360	43	PHASE II: Permeate compressor (SA-K-2631) lube oil, jacket water and cylinder lube oil and instrument air	1G-15389;1G-15391;1G-15390;2G-16918	5. Lower Temperature	5.1. low ambient temperature/ start up conditions for lubrication oil on machine/ cylinders	5.1.1.1. frame oil heaters SA-K-2631 E3; 5.1.1.2. auxiliary oil pump designed for low temperature duty (5 oC)	5.1.1.1. operating procedures part of operating manual to include checking of the frame lubrication oil circuit temperatures to establish need for heater start up	PIL/ KPC	262	Rotating (vendor) / Process	R	Procedure	Vendor confirmed that operating manual shall include manual start-up of electric heater.	-

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
361	43	PHASE II: Permeate compressor (SA-K-2631) lube oil, jacket water and cylinder lube oil and instrument air	1G-15389;1G-15391;1G-15390;2G-16918	5. Lower Temperature	5.1. low ambient temperature/ start up conditions for lubrication oil on machine/ cylinders	5.1.2.1. cylinder oil heaters SA-K-2631 E5; 5.1.2.2. cylinder oil pump designed for low temperature duty (5 oC)	5.1.2.1. refer to 4.2.1.2 Ref. 260			Rotating (vendor) / Process	R			-
362	43	PHASE II: Permeate compressor (SA-K-2631) lube oil, jacket water and cylinder lube oil and instrument air	1G-15389;1G-15391;1G-15390;2G-16918	5. Lower Temperature	5.1. low ambient temperature/ start up conditions for lubrication oil on machine/ cylinders	5.1.2.1. cylinder oil heaters SA-K-2631 E5; 5.1.2.2. cylinder oil pump designed for low temperature duty (5 oC)	5.1.2.2. operating procedures part of operating manual to include checking of the lubrication cylinder oil circuit temperatures to establish needs for heater start up	PIL/ KPC	263	Rotating (vendor) / Process	R	Procedure	Vendor confirmed that operating manual shall include manual start-up of electric heater.	-
363	43	PHASE II: Permeate compressor (SA-K-2631) lube oil, jacket water and cylinder lube oil and instrument air	1G-15389;1G-15391;1G-15390;2G-16918	5. Lower Temperature	5.2. low ambient temperature/ start up conditions for jacket water system	5.2.1.1. jacket water heaters SA-K-2631 E4; 5.2.1.2. individual jacket water line at temperature guages	5.2.1.1. provide low temperature alarm from 26 TT 3422	PIL	264	Rotating (vendor) / Process	R	Alarm/DCS	Shown in the revised (Rev. D) P&ID received from MES.	PID 2G-16918, A2
364	43	PHASE II: Permeate compressor (SA-K-2631) lube oil, jacket water and cylinder lube oil and instrument air	1G-15389;1G-15391;1G-15390;2G-16918	6. Higher Level	6.1. no proper indication on P&ID for level glass	6.1.1.1. spillage to catchpan	6.1.1.1. provide proper symbol on P&ID for level glass on cylinder oil reservoir	PIL	265	Rotating (vendor) / Process	R	PID representation	Shown in the revised (Rev. D) P&ID received from MES.	PID 1G-15391, I9
365	43	PHASE II: Permeate compressor (SA-K-2631) lube oil, jacket water and cylinder lube oil and instrument air	1G-15389;1G-15391;1G-15390;2G-16918	8. Maintenance	8.1. one JW pump under maintenance/ testing by using the return line to JW tank	8.1.1.1. none	8.1.1.1. review need for pressure gauge in each pump discharge line up stream of the isolation valves	PIL	266	Rotating (vendor)	R	Study/Review	Shown in the revised (Rev. D) P&ID received from MES.	PID 2G-16918, C3 and D3
366	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	1. More Flow	1.1. increased flow from permeate compressor stage 3	1.1.2.1. none	1.1.2.1. Ref. # 2			Process	R			PID 612, A5
367	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	1. More Flow	1.2. failure of the controller 26 PICA 339 causing valve 26 PCV 339B to fully open	1.2.2.1. none	1.2.2.1. Ref. # 2			Process	R			PID 612, A5
368	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	2. Less Flow	2.1. partial opening of the manual isolation valves	2.1.2.1. none	2.1.2.1. Ref. # 2			Process	R			PID 612, A5
369	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	2. Less Flow	2.3. mesh pad (SA-V-2634) & inlet strainer blockages on the suction strainers stage 4 (SA-K-2631)	2.3.1.1. production log (DCS); 2.3.1.2. differential pressure indication for stages 4 suction strainer	2.3.1.1. operator's manual to include trouble shooting of the demister pad blockage by checking reading of 26 PICA-339 and 26 PIAL-341	PIL/ KPC	267	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
370	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	2. Less Flow	2.4. failure of the control loop hardware 26 PICA 339 causing valve 26-PCV 339A to fully open	2.4.1.1. none	2.4.1.1. Ref. # 2			Process	R			PID 612, A5
371	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	2. Less Flow	2.4. failure of the control loop hardware 26 PICA 339 causing valve 26-PCV 339A to fully open	2.4.2.1. DCS production log; 2.4.2.2. 26 PIAL 341; 2.4.2.3. refer to 2.1.1.3	2.4.2.1. review operator's action in the case of failure of the controller	PIL/ KPC	268	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
372	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	2. Less Flow	2.5. failure of the controller 26 PICA 339 causing valve 26-PCV 339A to fully open	2.5.1.1. none	2.5.1.1. Ref. # 2			Process	R			operating manual
373	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	2. Less Flow	2.5. failure of the controller 26 PICA 339 causing valve 26-PCV 339A to fully open	2.5.2.1. DCS Diagnostics; 2.5.2.2. refer to 2.4.2.2 and 2.4.2.3	2.5.2.1. refer to 2.4.2.1 Ref. 268			Process	R			PID 612, A5
374	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	2. Less Flow	2.6. inadvertant failure of suction or discharge compressor stage 4 valves	2.6.2.1. none	2.6.2.1. Ref. # 2			Process	R			PID 612, A5
375	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	3. No Flow	3.1. Inadvertant closure of manual valves	3.1.2.1. none	3.1.2.1. Ref. # 2			Process	R			PID 612, A5
376	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	5. Lower Pressure	5.1. accidential damage to pipes/valves/equipment	5.1.1.1. F &G system; 5.1.1.2. ESD system; 5.1.1.3. 26 PZALL-342; 5.1.1.4. 26 PICAL-339	5.1.1.1. Ref # 9			HSE	R			PID 612, A5
377	44	PHASE II: From 26 ESV 307 to 2nd stage Membrane Pretreatment Skid (SA-M-2633)	1820-SA3-26-EPR-PID-563;1820-SA3-26-EPR-PID-564	6. Higher Temperature	6.4. motor selection in manual/fail to start when required	6.4.1.1. refer to 6.2.1.1 and 6.1.1.2; 6.4.1.2. 26 YL 303; 6.4.1.3. 26 HS 306 (local start)	6.4.1.1. provide operating procedures part of operating manual to start motors from the field in the case of failure to start from DCS (NOTE: common for all of the fin fan coolers in the plant)	PIL/ KPC	269	Process	R	Procedure	Agreed. It will be included in the operating manual.	operating manual
378	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	4. Higher Temperature	4.2. heater left on during summer conditions/failure of the thermostat (lube oil, cylinder oil and jacket water systems)	4.2.1.1. refer to 4.1.1.1; 4.2.1.2. 25 TAH 3369	4.2.1.1. heater controls to be shown on the P&ID (SA-K-2531-E3/4/5)	PIL	270	Rotating (vendor) / Process	R	PID representation	Shown in the revised (Rev. D) P&ID received from MES.	PID 1G-15393, D5
379	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	4. Higher Temperature	4.2. heater left on during summer conditions/failure of the thermostat (lube oil, cylinder oil and jacket water systems)	4.2.1.1. refer to 4.1.1.1; 4.2.1.2. 25 TAH 3369	4.2.1.2. review need for temperature gauge in the common oil line from cylinder oil tank	PIL	271	Rotating (vendor)	R	Study/Review	Shown in the revised (Rev. D) P&ID received from MES.	PID 2G-16919, E5
380	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	4. Higher Temperature	4.4. motor bearing damage	4.4.1.1. 25 TI 3354/3355	4.4.1.1. provide high temperature alarm from 25 TI 3354/3355	PIL	272	Rotating (vendor) / Instrument	R	Alarm / DCS	Shown in the revised (Rev. D) P&ID received from MES.	PID 1G-15393, B2
381	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	5. Lower Temperature	5.1. low ambient temperature/ start up conditions for lubrication oil on machine/ cylinders	5.1.1.1. frame oil heaters SA-K-2531 E3; 5.1.1.2. auxiliary oil pump designed for low temperature duty (5 oC)	5.1.1.1. operating procedures part of operating manual to include checking of the lubrication oil circuit temperatures to establish needs for heater start up	PIL/ KPC	273	Rotating (vendor)	R	procedure	Vendor confirmed that operating manual shall include manual start-up of electric heater.	-
382	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	5. Lower Temperature	5.1. low ambient temperature/ start up conditions for lubrication oil on machine/ cylinders	5.1.2.1. cylinder oil heaters SA-K-2531 E5; 5.1.2.2. cylinder oil pump designed for low temperature duty (5 oC)	5.1.2.1. refer to 4.2.1.2 Ref. 271			Rotating (vendor)	R			-
383	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	5. Lower Temperature	5.1. low ambient temperature/ start up conditions for lubrication oil on machine/ cylinders	5.1.2.1. cylinder oil heaters SA-K-2531 E5; 5.1.2.2. cylinder oil pump designed for low temperature duty (5 oC)	5.1.2.2. operating procedures part of operating manual to include checking of the frame lubrication cylinder oil circuit temperatures to establish need for heater start up	PIL/ KPC	274	Rotating (vendor) / Process	R	Procedure	Vendor confirmed that operating manual shall include manual start-up of electric heater.	-
384	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	5. Lower Temperature	5.2. low ambient temperature/ start up conditions for jacket water system	5.2.1.1. jacket water heaters SA-K-2531 E4; 5.2.1.2. individual jacket water line at temperature guages	5.2.1.1. provide low temperature alarm from 25 TT 3369	PIL	275	Rotating (vendor) / Instrument	R	Alarm / DCS	Shown in the revised (Rev. D) P&ID received from MES.	PID 2G-16921, A2
385	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	6. Higher Level	6.1. no proper indication on P&ID for level glass	6.1.1.1. spillage to catchpan	6.1.1.1. provide proper symbol on P&ID for level glass on cylinder oil reservoir	PIL	276	Rotating (vendor) / Process	R	PID representation	Shown in the revised (Rev. D) P&ID received from MES.	PID 2G-16919, E8
386	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	8. Contamination	8.1. leaking of HC's through the packing to JW circuit	8.1.1.1. stuffing box; 8.1.1.2. sight glasses on JW return line; 8.1.1.3. practise of sampling JW system and add corrosion inhibitor accordingly	8.1.1.1. provide procedure part of operating manual to sample JW system and add corrosion inhibitor accordingly	PIL/ KPC	277	Rotating (vendor) / Process	R	Procedure	Vendor confirmed that it shall be included in vendor's Operating Manual.	-
387	45	PHASE II: Recycle compressor (SA-K-2531) lube oil, jacket water and cylinder lube oil and instrument air	1G15393;2G-16921;2G-16920;2G-16919	9. Maintenance	9.1. one JW pump under maintenance/ testing by using the return line to JW tank	9.1.1.1. none	9.1.1.1. review need for pressure gauge in each pump discharge line up stream of the isolation valves	PIL	278	Rotating (vendor)	R	Study/Review	Shown in the revised (Rev. D) P&ID received from MES.	2G-16921
388	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	1. Less Flow	1.1. partial opening of the manual isolation valves (isolation valves between change of spec CA3/AA3 and 2nd isolation valve downstream SA-E-2736 in line 3"-GD27713-AA3	1.1.1.1. none	1.1.1.1. remove all isolation valves on each line upstream / downstream SA-E-2736 and replace immediate isolation of SA-E-2736 with removable spools	PIL	279	Static (vendor) / Process	R	PID representation	Confirmed - DPS to remove all isolation valves on each line upstream / downstream SA-E-2736 and replace immediate isolation of SA-E-2736 with removable spools and it is reflected in the vendor PID.	PID DPS-2007-1036-100 sheet 6
389	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	1. Less Flow	1.4. damage to the piping/leaks	1.4.1.1. drip pan connected to open drain header (minor leakage)	1.4.1.1. refer to 2.8.2.1 (node 3), Ref # 159			Static(Vendor)/Piping / Civil	R			-
390	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	2. No Flow	2.1. inadvertant closure of manual valves	2.1.2.1. none	2.1.2.1. refer to 1.1.1.1 Ref. 279			Static (vendor) / Process	R			-

S.No	Node #	Node	Drawings	Deviation	Causes	Safeguards	Recommendations	By	Ref #	Responsibility	Status	Type	PIL / KPC Reply	Remark
391	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	2. No Flow	2.1. inadvertant closure of manual valves	2.1.2.1. none	2.1.2.2. provide locking arrangement for SA-E-2736 by-pass valve	PIL	280	Static (vendor)	R	Hardware	Confirmed, DPS to provide locking arrangement for SA-E-2736 by-pass valveAgreed and it is reflected in the vendor PID.	PID DPS-2007-1036-100 sheet 8
392	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	6. Higher Level	6.2. failure of controller 27-LICA-352 causing valve 27-LCV-352 to close	6.2.2.1. none	6.2.2.1. adjust the relative heights of the weirs for glycol and oil bucket as well as 27-LZAHH-307 height setting during design and check during commisioning	PIL/ KPC	281	Static (vendor)	R	Others	Confirmed, DPS to adjust the relative heights of the weirs for glycol and oil bucket as well as 27-LZAHH-307 height setting during design. Petrofac to check during commisioning.	-
393	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	6. Higher Level	6.3. inadvertant closure of all manual valves and control valves in the drain lines	6.3.4.1. none	6.3.4.1. refer to 7.2.2.1, Ref # 7			KPC	P			-
394	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	7. Lower Level	7.1. failure of the controller 27-LICA 306 causing valve 27-LCV-306 to fully open	7.1.1.1. DCS diagnostics; 7.1.1.2. downstream system high pressure protection	7.1.1.1. relocate 27 LZALL-360 to low level of the glycol compartment	PIL	282	Static (vendor)	R	PID representation	Confirmed, DPS to relocate 27 LZALL-360 to low level of the glycol compartment and the PID will be updated accordingly.	27 LZALL-360 it should be 306 PID DPS-2007-1036-100 sheet 1
395	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	7. Lower Level	7.2. inadvertant opening of 27-LCV 306 control valve by-pass in the drain lines	7.2.1.1. 27-LICAL-306; 7.2.1.2. DCS discrepancy alarm for control valves' position	7.2.1.1. refer to 8.1.1.1 ref.283			Static (vendor)	R		Confirmed. Refer vendor's P&ID.	PID DPS-2007-1036-100 sheet 5
396	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	8. Less Instrumentation	8.1. particulate matetial build up in the rich glycol streams	8.1.1.1. none	8.1.1.1. provide Differential Pressure Guage across rich glycol inlet /outlet of SA-E-2735	PIL	283	Static (vendor)	R	Hardware	Differential Pressure Guage across rich glycol inlet /outlet of SA-E-2735 is provided.	PID DPS-2007-1036-100 sheet 5
397	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	9. Maintenance	9.1. flushing / cleaning vessel or piping	9.1.1.1. none	9.1.1.1. review locations for UC on SA-V-2733 and provide them accordingly	PIL	284	Static (vendor)	R	Hardware	UC Locations provided on vessel detail drawings by DPS.	PID DPS-2007-1036-100 sheet 4
398	46	PHASE II: Rich glycol recirculation to SA-V-2734 including overhead vapor to SA-E-2737	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	9. Maintenance	9.2. access to elevated equipment / withdrawal of catridges from the filters tube bundle removal from SA-E-2736	9.2.1.1. none	9.2.1.1. carry out layout review for glycol regeneration skid to ensure proper access for maintenance	PIL	285	Static / Piping	R	Study/Review	Layout review carried out. Proper access for maintenance is available.	-
399	47	PHASE II: Lean Glycol from SA-V-2734 to SA-V-2732 including all glycol regeneration equipment relief and drain strains	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-52-EPR-PID-643;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	2. Less Flow	2.3. damage to the piping/leaks	2.3.1.1. drip pan connected to open drain header (minor leakage)	2.3.1.1. refer to 2.8.2.1 (node 3), Ref # 159			Static(Vendor)/Piping / Civil	R			-
400	47	PHASE II: Lean Glycol from SA-V-2734 to SA-V-2732 including all glycol regeneration equipment relief and drain strains	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-52-EPR-PID-643;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	9. Contamination	9.1. failure of tubes of SA-E-2734	9.1.2.1. 27-LIAH-350; 9.1.2.2. monitoring inventory/ make up of glycol	9.1.2.1. review requirements for utility connections for glycol side of SA-E-2735 and hot oil side of SA-E-2734 in order to provide flushing and hydro testing facility. Provide connections accordingly to review.	PIL	286	Static (vendor)	R	Study/Review	DPS recommends that removeable spools be used for cleaning/flushing operations	-
401	47	PHASE II: Lean Glycol from SA-V-2734 to SA-V-2732 including all glycol regeneration equipment relief and drain strains	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-52-EPR-PID-643;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	10. Failure instrumentation	10.1. failure of 52-PCV-308 in fully open position	10.1.1.1. 52-PVRV-301 venting to atmosphere; 10.1.1.2. 52-PVRV-300 venting to atmosphere.	10.1.1.1. Confirm venting point is included in the hazadrous area classification	PIL	287	HSE	R	Others	Considered, Refer note no. 9 (all vents will be treated as zone 1) in Hazardous Area Classification Layout,Doc. No.1820-SA3-74-EHS-HAC-001,Rev 0.	-
402	47	PHASE II: Lean Glycol from SA-V-2734 to SA-V-2732 including all glycol regeneration equipment relief and drain strains	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-52-EPR-PID-643;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	11. Maintenance	11.1. cleaning and venting of SA-T-5232	11.1.1.1. none	11.1.1.1. review requirements for internal access ladder and ventilation opening on the tank for gas freeing	PIL	288	HSE / Process	R	Study/Review	Agreed. It will be provided.	Mail sent to Bala for confirmation on 16 April 07
403	47	PHASE II: Lean Glycol from SA-V-2734 to SA-V-2732 including all glycol regeneration equipment relief and drain strains	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-52-EPR-PID-643;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	11. Maintenance	11.2. maintanance/ hydo testing SA E-2734	11.2.1.1. none	11.2.1.1. provide TEMA type exchanger easy withdrawal flange/ hydro testing connection	PIL	289	Static (vendor) / Process	R	Study/Review	Confirmed - exchanger is flanged. Removeable spools are provided for hydrotesting to preclude possible inadvert and pressurization of associated piping.	PID DPS-2007-1036-100 sheet 2
404	47	PHASE II: Lean Glycol from SA-V-2734 to SA-V-2732 including all glycol regeneration equipment relief and drain strains	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-52-EPR-PID-643;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	12. General	12.1. condensed water drum liquid discharge to open drain system	12.1.1.1. condensate is stabilized on the pressure of LP Flare; 12.1.1.2. open drain system is classified area	12.1.1.1. connect drainage of the glycol regeneration skid to open drain system and connect condensed water drum liquid discharge to closed drain system	PIL	290	Static (vendor) / Process	R	Others	Confirmed. Drainage of the glycol regeneration skid to open drain system and drainage for condensed water drum liquid discharge to closed drain system is provided.	PID DPS-2007-1036-100 sheet 2
405	47	PHASE II: Lean Glycol from SA-V-2734 to SA-V-2732 including all glycol regeneration equipment relief and drain strains	1820-SA3-27-EPR-PID-581;1820-SA3-27-EPR-PID-582;1820-SA3-52-EPR-PID-643;DPS-2007-1036-100 sheet 1;DPS-2007-1036-100 sheet 2;DPS-2007-1036-100 sheet 3;DPS-2007-1036-100 sheet 4;DPS-2007-1036-100 sheet 5;DPS-2007-1036-100 sheet 6;DPS-2007-1036-100 sheet 7	12. General	12.1. condensed water drum liquid discharge to open drain system	12.1.1.1. condensate is stabilized on the pressure of LP Flare; 12.1.1.2. open drain system is classified area	12.1.1.2. review closed drain drum pump SA-P-5233 A/B capacity based on recommendation 12.1.1.1	PIL	291	Process	R	Study/Review	Continuous drain from condensed water drum is only about 0.33 m^3/hr. Closed drain drum pump capacity is 2 m^3/hr. Selected flow for this pump is correct.	-
406	48	PHASE II: GTG package lubrication oil system	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149455	7. No Sampling	7.1. no clear sample point on the vendor schematic drawing	7.1.1.1. none	7.1.1.1. provide sample point in oil circuit	PIL	292	Rotating (Vendor)	R	Hardware	Sample point in oil circuit is provided.	Refer Note-6 of PID 680 1/2, 2/2
B 407	48	PHASE II: GTG package lubrication oil system	1820-SA3-80-EPR-PID-680/1;1820-SA3-80-EPR-PID-680/2;3A111-149455	8. Safety	8.1. loss of containment from the lubricating components	8.1.1.1. none	8.1.1.1. confirm secondary containment for machine lubrication oil is available (based on maximum volume of lubricating oil)	PIL	293	Rotating (Vendor) / HSE	R	Study/Review	Lubrication Oil system of GTG Package is connected to the Open Drain System.	

ATTACHMENT - 1

KAESER KOMPRESSOREN

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Petrofac Engineering & Construction
Attn.: Mr. Alok Roy

Linz, 09.02.09 / HS

Petrofac House
Al Khan Street
P.O.Box 23467
Sharjah, UAE

FMEA Analysis

Dear Sir,

We, KAESER Kompressoren GmbH, confirm that a FMEA (Failure Modes & Effect Analysis) for the Nitrogen Generation Package (KAESER/Generon Job-No.: MM076024) with its equipments is not available for issue.

All units, Nitrogen Generation Package are manufactured to Kaeser/Generon Standard Procedures and the design is based on many years experience within the Nitrogen Generation field.
All units manufactured are designed to meet all International design standards; all of these standards need full analysis on all possible failures.
This is completed on all machines and if required documentation can be reviewed (Risk Analysis documentation) at our works.

However this form of information is considered a highly confidential item and will not be released from the factory in any documentation form. If you require further help on this issue please do not hesitate to contact us.

Best Regards

KAESER KOMPRESSOREN
GESELLSCHAFT M.B.H.
4031 LINZ, DALLINGERSTRASSE 8

Ing. Stefan Hessmann
(Managing Director)

ATTACHMENT - 2

Solar Turbines

A Caterpillar Company

PETROFAC E & C INT'L LTD.
Job No.: JI - 187
A. Work may proceed, No more submission for review is required
B. Revise and resubmit. Work may proceed subject to incorporation of changes indicated.
C. Revise and resubmit. Work may not proceed
D. Review not required. Work may proceed
Signed:
Permission to proceed does not release fabricator of the obligation to furnish the equipment in accordance with purchase order drawings, specification, applicable code and does not constitute acceptance or approval of fabricator's design.
By: TAB Date: 01.07.2007

Khaldam Petrofac
PD#2-3A1144M

Fuels System Description

Reference: *Solar®* Drawing A3111-149456 Rev C0

Terminology

Normal Btu fuel stream – High Btu fuel including connection 671, V2P931, V2P932, EGF388, and the forward manifold (labeled "Train A").

Low Btu fuel stream – Low Btu fuel including connection 670, V2P931-1, V2P932, EGF388, EGF388-1, the forward manifold, and the aft manifold (labeled "Train B").

Normal fuel circuit – The fuel metering valve EGF388 and the forward manifold (labeled "Train A").

Augmentation circuit - The fuel metering valve EGF388-1 and the aft manifold (labeled "Train B").

Active fuel stream – The fuel stream either selected or not selected, which is presently supplying fuel to the gas turbine. During a transfer, this is the fuel intended to discontinue use by transferring to the inactive fuel stream.

Inactive fuel stream – The fuel stream either selected or not selected, that is not presently supplying fuel to the gas turbine. During a transfer, this is the fuel that is selected and is intended / desired to be used.

Fuel Selection

Fuel selection will include automatic and manual selection of modes of operation.

Automatic:

Provided all of the pre-conditions are met for Manual selection of the low Btu fuel stream, the control system will automatically select the low Btu fuel stream when the normal Btu fuel stream pressure decreases below a fixed level for more than 2 seconds.

Provided all of the pre-conditions are met for Manual selection of the normal Btu fuel stream, the control system will automatically select the normal Btu fuel stream when the low Btu fuel stream pressure decreases below a fixed level for more than 2 seconds.

PETROFAC INTERNATIONAL LTD.
DOCUMENT NO.:

JOB No.		PO No.	Tag No.	Code No.	Serial No.	REV.
J1	187	030001	68031	C99	002	A

8/4/2007 R. Mendoza

If both fuel stream supply pressures are low, the system will continue to operate on the active fuel stream.

The normal Btu fuel will be selected automatically on system power-up.

Manual:

Manual mode selection will allow the operator to select which fuel stream to operate on, provided preconditions exist as described below.

The desired fuel stream can be selected:

1. When the unit is shut down.
2. When the unit is ready to load or on-load.

Fuel stream selection cannot be performed when:

1. A start attempt is in progress until the unit has fully accelerated and has reached the ready to load state.
2. A cool down stop is active.

A particular fuel stream cannot be selected unless the fuel supply pressure is above the alarm level. If both fuel supply transmitters indicate both streams are at or below the alarm level, the selected stream will remain active / selected, and selection of the opposite stream will not be possible.

Start

While shut down, when a start attempt is initiated, the selected fuel stream will be used to perform a valve integrity check, ignite the combustor, and accelerate the engine to the ready to load condition. Fuel selection will not be possible during the start sequence.

Valve Integrity Check:

Solar standard valve integrity check will be performed upon start. However, this check will be performed using the selected fuel stream primary shut-off valve (V2P931/931-1), vent valve (V2P941/941-1), and associated transmitter arrangement (TP386/386-1, TP342-1/342-2, TP398/389-1), along with the common secondary fuel shut-off valve (V2P932). Only the selected stream primary shut off valve will be exercised during the check. Both of the fuel stream metering control valves (EGF388/388-1) will be position checked during the valve check sequence, regardless of the fuel stream selected. The basic check sequence includes:

1. Ensuring sufficient fuel supply pressure is available to perform an adequate integrity check.

2. Ensuring the selected stream inter-valve pressure can be vented and remain vented.
3. Position checking the metering control valves.
4. Opening the selected stream primary shut-off valve to ensure fuel is admitted.
5. Closing the selected stream primary valve and ensuring fuel pressure remains trapped for a predetermined period of time.
6. Opening the selected stream primary shut-off valve and the common secondary shut-off valve to ensure fuel is admitted into the secondary downstream piping.
7. Closing the primary and secondary shut-off valves and ensuring fuel pressure remains trapped for a predetermined period of time.

Ignition

During a start sequence, after the valve integrity check of the selected fuel stream is completed, and all other normal preconditions are completed for a normal start operation (pre-lubrication, exhaust purge, process gas sequencing etc), a normal ignition sequence will be conducted.

For high Btu fuel start, the torch valve (V2P940) will be opened. Only one of the fuel control metering valves (EGF388) will open to admit fuel to one of the injector manifolds (Forward).

For low Btu fuel start, the torch valve (V2P940-1) will be opened. Both of the fuel control metering valves (EGF388/388-1) will open to admit fuel to both of the injector manifolds. Nominally 70% of the command to the normal Btu metering valve will be commanded to the augmentation fuel metering valve

High manifold pressure will be calculated as normal using the active valve inlet pressure and the active valve differential pressure. Either manifold pressure exceeding the limit during the ignition sequence will result in a high fuel flow shut down.

Transfer

Transfer from one fuel stream to the other is possible under the conditions listed in the Fuel Selection section above. All of the preconditions for manual transfer must be met, before a manual or automatic transfer can be performed. If during the transfer process, preconditions are not met, the system will abort the transfer and resume operation on the previously selected / active fuel stream.

Valve Integrity Check:

No valve integrity check will be performed upon selection / transfer to an inactive fuel stream.

Manifold Fill

Transfer to Low Btu Fuel

While running, upon selection to transfer to the low Btu fuel stream, the primary shutoff valve (V2P931-1) for the low Btu stream will be opened. The inactive control valve will be commanded to fixed low command. A ten second delay will allow the gas manifold to pressurize / fill. When the fill period is complete, the augmentation control described below will become active.

Transfer to High Btu Fuel

While running, upon selection to transfer to the high Btu fuel stream, the primary shutoff valve (V2P931) for the high Btu stream will be opened. For transfer to the high Btu fuel, no manifold fill is required because it is already pressurized and active.

Augmentation Control

Transfer to Low Btu Fuel

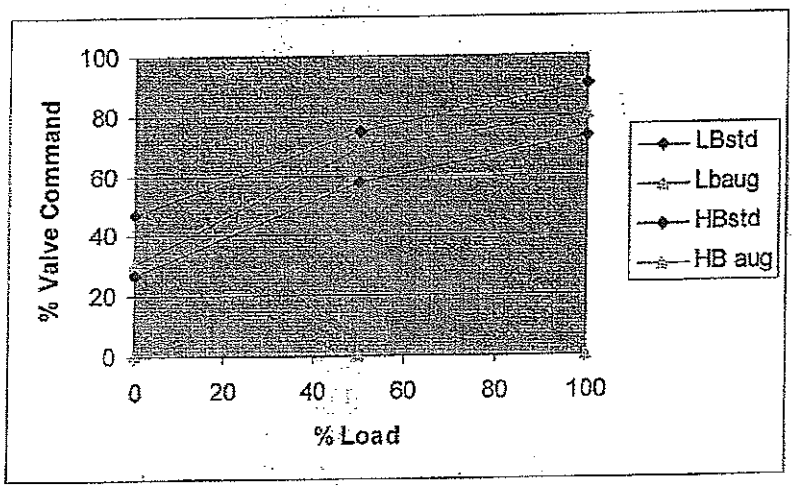
When the manifold fill period is complete, an augmentation factor will be ramped from 0 to 0.7 at an adjustable rate. This factor will be multiplied by the governor demand, which in turn will be characterized and used as the command to the augmentation circuit fuel metering valve. The augmentation factor will be adjustable from 0.5 to 1.0 and nominally set to 0.7. The rate will be nominally set to 10% per second and will be adjustable. When the augmentation factor reaches 50% of the adjustable level, the high Btu fuel stream primary shutoff valve (V2P931) will be closed.

Transfer to High Btu Fuel

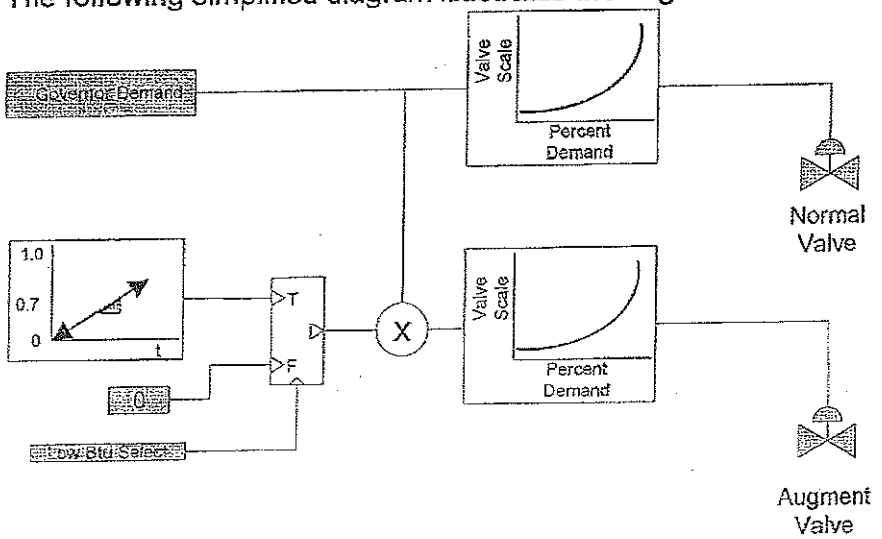
When the high Btu fuel stream primary shutoff valve is opened, the augmentation factor will linearly decrease from the preset value (nominal 0.7) to zero at the same adjustable rate that is used for transferring to low Btu fuel. When the augmentation factor reaches 50% of the adjustable level, the low Btu fuel stream primary shutoff valve (V2P931-1) will be closed.

The nominal 100% of governor demand directed to the normal circuit and 70% of governor demand directed to the augmentation circuit results in approximately 60% of the total flow though the normal circuit and 40% of the total flow through the augmentation circuit.

The expected fuel metering valve demand(s) for each fuel as a function of rated load is shown below. The fuel supply pressure is assumed to be 330 psig and the fuel composition as specified in SER 06-062. Upon opening of the inactive primary shut off valve, depending upon supply pressures, the inactive stream may or may not begin flowing to the gas turbine. The fuel control governor will be expected to correct for the change in heating value during the transition. This will likely require higher integral gains for each of the control modes when the low Btu fuel is active. Standard gains can be resumed when the standard Btu fuel is active exclusively.

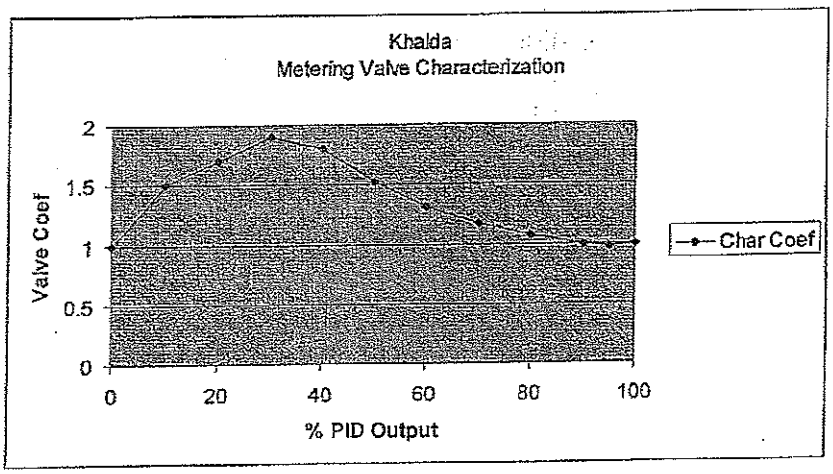


The following simplified diagram illustrates the augmentation control scheme.



Shut down
Upon shut off of all fuel to the gas turbine, both primary shut off valves, and both fuel metering control valves, and the secondary shut off valve will be commanded fully closed. Both Vent valves (V2P941/941-1) will be commanded open to vent the inter-stage pressure. When the pressure has been confirmed low, the vent valves will be closed. After a preset time, when the pressure has been confirmed to have remained low, both fuel metering control valves will be commanded to 6% open to vent any trapped pressure between the secondary shut off and metering valves.

Valve Characterization
The standard fuel metering valve characterization will be modified to ensure the full area of the metering valve is available.
The new characterization coefficients are shown here:



PIDEOutp	Char Coef
0	1
10	1.5
20	1.7
30	1.9
40	1.8
50	1.53
60	1.32
70	1.17
80	1.07
90	0.99
95	0.97
100	1

Manifold Light-off Pressure Limits
For light off / ignition when starting on the standard Btu fuel, the standard high manifold pressure limit will be applied to the active / normal fuel stream (8psig). Only the normal Btu metering valve and manifold (Fwd) will be used.

When starting on low Btu fuel, the following high manifold limits will be applied. If either manifold indicates pressure higher than shown, the start will be aborted.

Normal Btu Manifold (Fwd) Pressure limit = 17 psig.
Augmentation Manifold (Aft) Pressure limit = 12 psig.

Acceleration Fuel Limiting

When operating on low Btu fuel, the flow through both fuel streams must be calculated and summed to determine the total flow. The acceleration fuel limit schedule must be adjusted such that when not operating on low Btu fuel, the standard schedule is used.

psig	lbm/hr	
Pcd	Std Btu	Low Btu
0	600	1738
80	3061	8867
200	5789	16769
280	7068	20474